JOHNS HOPKINS
UNIVERSITY CIRCULARS

Published with the approbation of the Board of Trustees

VOL. XI.—No. 99.] BALTIMORE, JUNE, 1892. [PRICE, 10 CENTS.

NOTES OF RECENT PUBLICATIONS, INVESTIGATIONS AND STUDIES.

A Vedic Concordance. Being a Collection of the Hymns and Sacrificial Formulas of the Literature of the Vedas. By MAURICE BLOOMFIELD.

Those who have devoted themselves within recent years to the interpretation of the Vedas, the earliest religious book of the Hindus, have one and all become impressed with a growing sense of the difficulty, as well as the importance of the task. As for the importance of the study of the Vedic literature, we cannot repeat too often within the hearing of both the initiated and the layman that Vedic science is not now, and never has been, an isolated pursuit; it is not Indian historiography, merely; it is not Hindu mythology, theosophy, and philosophy alone. Vedic science has contributed, and is now contributing, some of the most vital elements to the scientific pursuit of the Indo-European languages, and linguistic science in general; it has always been, and is now, one of the prime elements in the reconstruction of the prehistory of the Indo-European peoples, and these methods of reconstructing pre-historic times have become the pattern for similar studies in other philological quarters. In fact, the prime claim which the Vedic scholar will forever be able to make without presumption is that his field has been the nursery of methods. New sciences have sprung up chiefly through the impulse of Vedic science. Comparative mythology is a science which it is now fashionable to belittle on account of excesses on the part of certain of its over-enthusiastic devotees, but the fundamental facts and processes of the science are imperishable. The scientific study of the history of religion is a factor in the philosophic thought of the day more fruitful, more liberalising, more truly human than any of the sisterhood of historical sciences. There is no domain upon the earth which offers such perfect opportunities for watching the growth and change of religious ideas through continuous centuries without interruption and interference from without, as the domain of Vedic India if it is followed step by step until it has passed through its numerous subtle stages into modern Hinduism.

And yet Vedic science is truly in its very beginnings. We may say, paradoxically, that we know less about the Vedas than we did, or thought we did, twenty years ago. The complete translations of the Veda are still useful for general orientation, but their trustworthiness on any given question is of the most minimal degree. We may claim fairly that Vedic interpretation is still in the stage of decipherment; each word must be tested in the light of all its occurrences; each idea carefully confronted with every other before its true bearing is understood. Such processes before long exhaust the material in a literature of limited scope, but the Vedas are very extensive; 'a knowledge of all the Vedas'—*sarvavidyā* as the Hindus call it—is given to no one.

Precisely at this point, we conceive, lies the chief difficulty. The larger hermeneutic efforts in Vedic philology have been hampered by a restriction, voluntary or involuntary on the part of the interpreter, of the materials which he undertook to investigate. Those who have undertaken the more special lines of investigation, such as the character of a single divinity, the nature of a legend, the meaning of a difficult word, have also been hampered by their failure to control the materials bearing upon their inquiry. It is astonishing to see how great has been the waste of intellectual resource, how much ingenuity has been frittered away over questions, simply because the inquirer carried on his search with only a part of the materials instead of the whole. Especially, the students of the Vedic hymns have been in general too much inclined to separate the lyric hymns of prayer from the remainder of the Vedic tradition, the ceremonial practices and the ceremonial speculations. The Mantras were regarded as a part of the literature essentially more archaic and more important than the Brāhmaṇas, Upanishads, and Sūtras. As regards the Rig-Veda the unwholesome tendency to view it as a 'historical collection,' set on foot for purely literary purposes, compiled by persons of literary tastes and tendencies, has not completely died out. Years ago we expressed the view that the Rig-Veda like the other Vedic collections served a purely religious purpose, that it was in fact a prayer-book, whose interpretation ought not to be undertaken without reference to special religious practices and occasions. The Vedic hymns are not properly characterized even if we designate them as sacrificial poetry; they are not so much sacrificial poetry as the poetry of the sacrifice. India is nothing if not singular, and we need not shrink from realizing and confessing that the earliest Hindu poetry is not epic, not lyric in the ordinary sense, not didactic, but that is almost throughout dominated by a single idea, the beatification, as it were, of the sacrifice. The sacrifice is the dominant idea of Vedic life; the chief acts of the people living this life as recorded to us by the literature, are sacrificial; their chief thought the praise and conciliation of their gods at the sacrifice. The soma, the sacrificial drink, is ever present in express statement, or by implication. So much so, that in a somewhat narrow, yet essentially truthful, way, the Vedic religion may be designated as a soma-religion, or a somic religion.

This view adjusts the Rig-Veda into its proper position within the entire Vedic domain. The Rig-Veda is an integral part of that domain; its treatment should be neither self-centered, nor chauvinistic; we may not hope to understand it without understanding the whole. And conversely the ceremonial, the nature and origin of the ritualistic practices, the customs of private and public life, are in India so eminently religious, they stand so near to the gods, they are, so to say, so eminently polytheocratic, that their sense and essence will become revealed only in the light of the entire religious life, in the light of the Vedas, as a whole.

If these remarks are true, if this need of making the *sarvavidyā*, the knowledge of the Vedas in their entirety, an ideal less and less far removed from realization, it will be necessary to arrange for certain preliminary aids which shall serve as connective tissue between the various parts. These preliminary aids are at present almost entirely wanting. The point is evidently this, to control, if possible, the entire line of statements in the Veda bearing upon a certain divinity, upon a certain practice, upon a certain custom, upon a certain conception of any sort whatever. I may say at once that no helps of this sort will ever do away with painstaking, courageous, detail investigation; no royal road to complete information will ever be found short of reading the texts themselves continuously, and without special *ad hoc* motives. The successful Vedist will ever be the one who has merged himself most completely in this Titanic labyrinth of religious ideas; he who will assimilate the largest stock of these ideas will attack a given difficulty with the surest aim and with the most penetrating effect.

But the extent and bulk of the literature renders it imperative that every imaginable aid to its control shall be furnished, just as on the other hand the singular unity of its character and contents promises that the construction of such aids can be undertaken with the assurance of both outward and inner success. Three directions suggest themselves in which roads may be constructed through the thicket. The first is an Index Verborum of the Vedic writings. We have excellent indexes of the Rig-Veda and the Atharva-Veda, as also of quite a number of Sūtra-texts. The worker in Vedic details knows how instinctively he turns first of all to indexes for guidance to information on any given point; and he can appreciate the feeling of increased security which would be established by indexes of the remaining texts. Especially needful is the index of some one of the mixed Yajus and Brāhmaṇa texts, say e. g. the Māitrāyaṇī-Saṁhitā. The Rig-Veda presents many matters in an inflated, mystical way which become more intelligible in the more practical atmosphere of the Yajus. Further, the control of one of the Yajus-texts in general opens out the remaining texts of the same class, and the Sūtras which attach themselves immediately are also controlled without difficulty from the vantage-point of the corresponding Yajus-text. I feel certain from my own repeated wants that the indexing of such a text would strengthen very markedly our control of the Vedic literature. And we may venture to express the hope that the editors of the few remaining texts which have not seen the light of their first editions, as well as of new editions of published texts, will not fail to add the invaluable help of a complete index verborum.

A second mode of strengthening the hold upon the Vedic literature would be a subject index. There, again, is a field of systematic labor which is not hopelessly large, and which would without doubt in itself save a generation of futile effort. The religious ideas which are openly dealt with in the texts, as well as the institutional ideas of private and public life, which can only be read between the lines, need to be assembled and grouped so as to ensure a quick survey of the materials bearing upon any given point. Of course, such a work involves in a measure a *petitio principii*, since it assumes a knowledge of these materials which are investigated further by means of this very index. Philologists, however, are familiar both with the defects and advantages of such methods; they know that such arrangements, even if they involve a considerable proportion of error, are valuable for breaking the ground, for path-making, that they contain in themselves, when properly handled, the corrective of many of their own errors. Such a work is doubtless too great for any single scholar to venture, but in these days of coöperative encyclopædic undertakings there would be no serious difficulty in organizing a company of younger scholars headed by some man of ripe experience who would exhaust the material within a reasonable time. The arrangement of the materials would require the skilled hand of the leader.

A third highway through the Vedas is the one which I have undertaken to construct with the help of a willing band of pupils and other friends. This is the concordance of the metrical lines and the sacrificial formulas of the entire Vedic literature. In other words, it is a concordance of the Mantra-language. The Mantras are to a considerable extent coincident with the Vedas themselves; they are the language of the songs with which the gods are praised, and the formulas which accompany the separate acts of the sacrifice. The Mantras are psalmody and liturgy. The practices and ceremonies of the Vedas can no more be imagined without them, than they themselves have any real existence without the practices of the Vedas. The Mantras occur in separate collections as well as in texts which arrange successively in their proper order, the ceremonies, and the songs of praise and liturgical formulas employed in connection with them. Thus the schools of the Rig-Veda, the Atharva-Veda, the Sāma-Veda, and the White Yajur-Veda have constructed separate collections of the Mantras, which appear worked up entirely, or in part, in the ceremonial books of each of these Vedas. The schools of the Black Yajur-Veda on the other hand do not possess separate collections of Mantras; in their traditional books Mantra and ceremonial alternate with one another. All of the Brāhmaṇa and Sūtra texts, moreover, quote Mantras and formulas, very largely those representing the collections of their particular school, but in a noteworthy measure also those which do not occur in their own school. The latter are either found in the collection of some other school, or, to a not inconsiderable extent, are original in those Brāhmaṇa or Sūtra texts. The collection of the Rig-Veda alone comprises more than one thousand hymns, ten thousand stanzas, and not far from 40,000 verse-lines. The Atharva-Veda contains more than half that quantity. The number of verse-lines and formulas of the entire Vedic tradition may be estimated roughly at about one-fourth of a million of passages, or more.

Now this entire tradition of the hymns and formulas may be described as a floating one. The hymnal and formulary material of the Vedic period is in a large measure common traditional property. The collection of Mantras in one Veda, or in one Vedic school does not present materials totally different from that of any other school. Such a diversity is entirely unknown in the Vedas. The various schools repeat to a large extent the same stock of material with or without variation, standing at times so near to a sister school as to be differentiated from it only by a few insignificant variants and addenda, while, on the other hand, in cases of extreme difference, the material varies greatly. Thus the Atharvan schools present materials very largely, though not entirely different, from the Rig-Veda schools.

The purpose of this work is to give a compact history of each lyric line, and each liturgic formula in the entire literature. The reader of a certain Vedic text shall be able in the case of each Mantra or formula which he encounters to tell at a glance every other occurrence and employment of the same in the remaining body of texts. The value of this is primarily three-fold. First, the individual lines do not, as has been hinted before, occur in precisely the same form, but in forms varying more or less in arrangement and choice of words and grammatical form. Now it is important to have all variants; frequently the reading of one school is thus shown to be manifestly inferior to that of another, or even totally corrupt and untenable. Secondly, the order and connection of the verses differ very greatly in the different schools. It is therefore of the utmost importance to establish by proper comparison which combination of verses is the original one, and which is secondary. Thirdly, the collection will give the key to every employment of each line in the ceremonial practices. Of recent years I have laid especial stress upon the importance of this knowledge, and in my Vedic studies I have been able to exhibit a noteworthy variety of instances which illustrate that subtle blending of the song and the ceremony which makes a full knowledge of both necessary for the understanding of either.

I shall here only briefly hint at the remaining uses of such a collection. It is obvious that the future editor of new Vedic texts will find a complete and compact collection of all the Mantra literature an auxiliary of the first class. In the establishment of Vedic texts the Mantras are most recalcitrant, as they are written in a language which the scribes understood but imperfectly, differing as it does considerably from the classical language. Since a great deal of the material to be handled by the new editors is pretty certain to be contained in the literature previously published, the work will aid him decidedly in the establishment of his own text. Various other uses of the work will grow out of the fact that it assembles in one place, in fact in one volume, the entire material of one dialect of the Hindu literature, and that too, the dialect which is on the whole the oldest. Special researches in the grammar of this dialect, will be promoted in the most obvious manner, as phenomena of one class which are now scattered through fifty or more works will be accessible within narrow compass. We may also hope that the character of this dialect of the Mantras will stand out in truer relief, and that most difficult question of the inter-relation of the ancient dialects of India will be brought nearer to a definite solution. I shall only hint, in this connection, at the fact that the dialect of the sacrificial formulas, many of which are solemn and archaic, is certain to be recognized as the oldest Hindu prose, in distinction from the dialect of the Brāhmaṇas which has hitherto been regarded in that light. The language of the sacrificial formulas stands very near the lyric Mantras, considerably nearer than that of the Brāhmaṇas, and its separate characterization will doubtless reveal definite properties which are not at present observed.

The corps of gentlemen who are now actively engaged in coöperating with me are either present or former members of the Vedic Seminary of this University. They are Messrs. M. Brandow, H. L. Ebeling (Ph. D., '91); E. W. Fay (Ph. D., '90); C. J. Goodwin (Ph. D., '90); J. E Harry (Ph. D., '89); J. T. Hatfield (Ph. D., '90); D. H. Holmes; J. T. Lees (Ph. D., '89); H. W. Magoun (Ph. D., '90); J. L. Moore (Ph. D., '91); and R. B. Steele (Ph. D., '90). Dr. Hanns Oertel of Yale University is also furnishing helpful materials from manuscripts in the library of the American Oriental Society at New Haven.

Contributions to the Interpretation of the Veda. Third, fourth, and fifth series.

By M. Bloomfield.

The first series of these studies was published in the seventh volume of the *American Journal of Philology* (pp. 466–88), under the title 'Seven Hymns of the Atharva-Veda.' The writer was engaged at the time with his manuscript edition of the Kāuçika-Sūtra, the ceremonial book of the Atharva-Veda. In the course of these studies he became deeply impressed with the importance of consulting the practices and ceremonies which accompany the charms and incantations of the Atharvan, before arriving at any conclusion as to the true meaning of the hymns themselves. The article contained seven distinct cases of hymns which had been previously translated—at times by as many as three or four authorities—and these translations were shown to be erroneous. The author's own interpretations were based upon suggestions from the ritual, and they have thus far commended themselves to the unanimous acceptance of his fellow-workers.

The titles of the subjects treated in the first series are:

1. Formula against diarrhoea.
2. Prayer to lightning conceived as the cause of fever, headache, and coughs.
3. A woman's incantation against a rival.
4. The *srāktya-maṇi*, an amulet from the *sraktya*-tree.
5. Charm against an opponent in debate.
6. Ants as antidote against poison.
7. Propitiation of the weather-prophet.

The recognition was not long to be deferred that the same methods of investigation need to be applied to the Vedas in general. The entire body of Vedic writings must be considered in the interpretation of any part. One of the main faults of the explanation of the Vedic hymns in the past has been the failure to investigate courageously and thoroughly the materials outside of the hymns. The charge which is brought against Vedic interpreters with greatest frequency and show of justice is that their translations are vaguely general, offering not infrequently a more or less unintelligible jingle of words in the place of plain sense.

The second series of contributions was published in the *American Journal of Philology*, Vol. XI, pp. 319–56. It aimed to exhibit this truth in connection with writings of the Rig-Veda and Yajur-Veda, as well as the Atharva-Veda. The second series consists of six studies, as follows:

8. On the *jāyānya*-charm and the *apacit*-hymns of the Atharva-Veda.
9. On the ἁπ. λεγ. *talīdya*, Av. VII, 76, 3.
10. On the so-called fire-ordeal hymn, Atharva-Veda, II, 12.
11. Women as mourners in the Atharva-Veda.
12. On a Vedic group of charms for extinguishing fire by means of water-plants and a frog.
13. On the Vedic instrumental *paḍbhis*, and the word *paḍbīça*.

The third series is devoted more especially to mythological subjects. It is published in the fifteenth volume of the *Journal of the American Oriental Society*, and consists of three articles, brief abstracts of which are now given.

14. The story of Indra and Namuci.

Indra, the god of the clear sky, is forever slaying with his thunderbolt the cloud-demons who obstruct the rain and withhold from mortals the blessings consequent upon it. But in one instant he encounters the demon Namuci ('Don't-let-go,' or 'Hold-fast'), who, instead of falling an easy victim to his thunderbolt, engages him in close combat and rather gets the better of him. Namuci holds Indra fast, and refuses to let him go unless he enters into a strict agreement not to slay him subsequently. The compact is constructed very diplomatically, so as apparently to leave no possibility of danger to Namuci from Indra: the latter agrees not to slay the former either by day or by night: i. e., as Namuci construes it, at no time whatsoever. He agrees further not to slay him either with a staff or a bow, with the flat hand or the fist, with anything wet or dry: i. e., as Namuci intends, with no known weapon.

For a while the pair are boon companions. But Namuci, the *āsura*, is bound to betray his nature, fundamentally hostile towards Indra, the *deva;* and upon one occasion, when Indra had imbibed freely of his favorite beverage, the soma, he plies him still further with the strong drink *surā* (brandy), which is regarded as unholy, and is no doubt conceived as the special drink of the Asuras. Indra becomes stupefied and loses his strength, his senses, the taste for food, and soma, and in the story Namuci is conceived as having robbed him of these and appropriated them to his own use.

The gods now step upon the scene. The Açvins, the heavenly physicians, and Sarasvatī, the goddess of wisdom, cure Indra, and afterwards Indra with their help concocts a plan by which he may slay Namuci without perjuring himself. In order to evade the clause of the compact which forbids him to do the deed either by day or by night, they choose the time of the dawn before the sun had risen, 'that being neither day nor night.' In order to introduce a weapon not excluded by the stipulation of the compact, they forge a bolt from the foam of the waters, 'that being neither wet nor dry.' Indra slays Namuci, but he is still without his soma, which now flows from the body of Namuci mixed with blood and impure, so that he may not drink it. Here again the Açvins lend their aid; they drink the loathsome mixture, and, having purified it in their divine bodies, they return it to Indra.

15. The two dogs of Yama in a new rôle.

At AV. vi. 80 a 'heavenly dog,' *divyaḥ çvā*, is mentioned who flies through the air and looks down upon all beings. Allusion is made in this to a legend reported in the Brāhmaṇas, according to which two heavenly dogs, formerly Asuras, contrived to ascend the heavens and to gain there a permanent foothold. The Māitrāyaṇī-saṁhitā states explicitly that these same two dogs are the dogs of Yama. Further the two dogs of Yama, either under their collective name of *yamaçvā* or separately designated as *çyāma* (or *çyāva*) and *çabala*, are constantly identified in the Brāhmaṇas with day and night, and once in the Çatapatha-brāhmaṇa the moon is styled 'the heavenly dog who looks down upon the cattle.' The conclusion derived from all these statements is that in the Atharvan and the Brāhmaṇas the two dogs of Yama are familiarly identified with the sun and the moon.

This result is then brought to bear upon the reports on the two dogs of Yama in the hymns themselves, especially the very interesting passage RV. x. 14. 10–12, and the corresponding passages in other collections of *mantras.* It is shown that the apparently conflicting attributes which are bestowed upon them in the hymns are best separately accounted for and harmonized with one another by the aid of this very explanation: every statement in these much-discussed stanzas falls naturally into line with the other, and the passage seems to be freed from nearly every serious difficulty.

16. The marriage of Saraṇyū, Tvaṣṭar's daughter.

This legend is of a distinctly composite character. In it have been combined with considerable fancy a number of mythological and legendary points into a single result. This story must have been well known to the Vedic poets: first, because all later reports of it are essentially concordant; secondly, because it was sufficiently familiar to justify its embodiment into the condensed form of a *brahmodya* or riddle. The story seems to be as follows: Tvaṣṭar offers his daughter Saraṇyū in marriage to the whole world of gods and mortals, and the suitor who seems to have gained favor in his eyes is Vivasvant, the mortal. Saraṇyū, barely married, is displeased with Vivasvant, and flees from him, giving birth however to the twins Yama and Yamī, the reputed children of Vivasvant. In order to make sure her escape, she changes into a mare, and resorts to the gods, who hide her away from the mortals Vivasvant, Yama, and Yamī; and, in order to make matters still more safe, they construct a *savarṇā* which takes Saraṇyū's place in Vivasvant's affections. The word *savarṇā* means at the same time one who is like Saraṇyū in appearance, i. e. her double, and also one who is suitable in her character to the mortal Vivasvant—more suitable than the divine Saraṇyū, we may perhaps understand. Vivasvant begets Manu with the *savarṇā*, but ultimately finds out the deception practised upon him, follows Saraṇyū in the form of a horse, and, thus gaining her favor, begets with her the Açvins, 'the horsemen.' Saraṇyū abandons them also, just as she had previously abandoned the twins Yama and Yamī, and resumes, we may understand, her independent station as a divinity.

The fourth series has just appeared in the twelfth volume of the *American Journal of Philology*, pp. 414–43. It consists of three studies, lexical, grammatical and text-critical:

17. The meaning of the root *yup*.
18. On *jalāṣaḥ, jalāṣabheṣajaḥ, jalāṣam, and jālāṣam*.
19. On the thirteenth book of the Atharva-Veda.

The fifth series has just been presented to the American Oriental Society at its meeting in Washington in April, 1892. It consists of two elaborate studies, to wit:

20. The legend of Soma and the Eagle.
21. The group of Vedic words ending in *-pitvá*.

In the latter article the hopeless confusion and contradictoriness of all previous explanations of the words *sapitvá*, *abhipitvá*, and *prapitvá* is made manifest, and it is shown that they contain in their uniform ending the word *pitú* 'sap,' 'soma-juice.' *Sapitvá* means 'the act of drinking soma together,' 'boon companionship;' *prapitvá* means 'the act of drinking soma at the morning pressure' (*prātaḥ savana*); and *abhipitvá* 'the act of drinking soma at the evening pressure' (*tṛtīyaṁ savanam*). In illustration of the former the following short statement may be made:

The legend of the rape of the heavenly drink, the soma, is one of the most valued themes of the Vedic poets, and the story-tellers of the Brāhmaṇas. The event is alluded to constantly, and not infrequently narrated in full. Many have been the attempts to elucidate it. Adalbert Kuhn in his famous book, 'Die Herabkunft des Feuers und des Göttertranks,' supposes that Indra, having been confined in the bosom of the clouds, assumes the form of an eagle, and brings the Soma to the mortals, after having overcome Tvaṣṭar, or some other hostile divinity. Other interpreters, Ludwig, von Roth, Bergaigne, Pischel, and Hillebrandt have dealt with the myth; and in the opinion of the writer they have missed the point, because they do not pay due regard to the form of the legend in the Brāhmaṇas. Our interpretation is based upon the versions of the story and the allusions made to it in the entire literature. The versions of the story in the Brāhmaṇas substitute the *gāyatrī*-metre for the eagle. The *gāyatrī* in the mystico-sacerdotal language of these texts is a name for the heavenly Agni (the lightning). That is the eagle. The legend tells of the flight forth of the lightning from the womb of the cloud; as the lightning shoots down the heavenly fluid, the soma streams down upon the earth from the clouds. Then it becomes available at the sacrifice, especially in Indra's behalf, who is the soma-drinker by distinction.

On *εἰ* with Future Indicative, or Statistics and Statistics.

By B. L. GILDERSLEEVE.

The statistical method has been so much misused since it became the fashion that even those who helped to make it fashionable are becoming weary of the mechanical sorting of inorganic and insignificant facts, which can have no claim either to aesthetic or to scientific importance. What points deserve statistical study is a matter that is to be determined by insight before investigation begins, and the preciousness of statistics consists in exhaustive verification of what was already divined. Whenever this line is trangressed one hears the mocking song of Friedrich Vischer.

> Lass ersterben die Aesthetik,
> Lass erblühn die Arithmetik!
> Schüler, auf zum Heiligtume
> Der addierten Bröselkrume
> Walle feierlichen Schritts, u. s. w.

In every statistical research in which I have myself engaged or encouraged others to engage I have always discerned, or fancied I discerned, an organic principle, and no less in my first published paper than in my latest.

In 1876, I read a paper before the American Philological Association on the Use of *εἰ* with the Future Indicative and that of *ἐάν* with the Subjunctive in the Tragic Poets. The chief results of that paper, which have found acceptance in respectable quarters, were summarized in the Proceedings as follows:

"The *ἐάν* condition was divided [many] years ago[*] by Bäumlein into particular and generic. Accepting this division, which is naturally suggested by the character of the apodosis, it is proposed to examine the use of the former class of the *ἐάν* condition as compared with the form in *εἰ* with the future indicative.

"The *ἐάν* conditional sentence differs in future relations from the form *εἰ* with the future indicative—

1. In its greater temporal exactness;
2. In the absence of special tone.

"For these reasons it is preferred in prose to *εἰ* with the future indicative, which is used chiefly—

1. In minatory and monitory conditions;
2. When the future is used in a modal sense, with translation 'is to,' 'must,' etc.;
3. In connection with verbs and phrases of emotion (semi-causal), such as *αἰσχύνομαι, ἐλεῶ, δεινόν, αἰσχρόν, κ. τ. λ.*

"As the harsher, sterner form of the future condition, *εἰ* with the future indicative is far more frequently found in tragic poetry than in normal prose, and occurs in diminishing ratio in the three great tragic poets. In Aeschylus over seventy-three per cent. of future conditions are in the indicative; in Sophocles, over fifty-four per cent., or, if we leave out the Oedipus at Colonus and the Philoctetes, sixty-two and a half per cent.; while in Euripides only about forty-three per cent. have this form. A striking contrast to the usage of the tragic poets is presented by Aristophanes. In his future conditionals little more than twenty per cent. take the form *εἰ* with future indicative, and of sixty-seven such conditions fifty-three are minatory or unfavorable. Prose writers vary according to theme and individuality. In the speeches of Thucydides the proportion is nearly the same as in Euripides. In Lysias, judging by twelve speeches, *εἰ* with future indicative seems to occur with exceptional frequency. In Isocrates there is a marked variation in different discourses. In Xenophon's Anabasis the proportion is about the same as in Aristophanes.

"When *ἐάν* with the subjunctive and *εἰ* with the future indicative are used in antithesis, which does not occur very often, the tendency is to put the more favorable hypothesis in the subjunctive, the less favorable in the indicative. We may compare with this the common elliptical use of *εἰ δὲ μή*, after *ἐὰν μέν*."

Some years ago, to be more exact, in 1887, Professor E. B. Clapp, now of Yale University, expressed his dissatisfaction with my formulae for *εἰ* with the future indicative. In the *Transactions of the American Philological Association* for that year (p. 46) he says that "so far as the usage of Aischylos is concerned we cannot advance much beyond the rule of Professor Goodwin, who considers the future indicative with *εἰ* as only a way of expressing 'more vividly' precisely the same idea conveyed by *ἐάν* with the subjunctive, except in cases where the former may be translated *is to* or *must*." Not convinced by my explanation which will be found in the *Am. Jour. of Philology*, IX, 491, and not deterred by Professor Goodwin's virtual acceptance of my views in the last edition of the Moods and Tenses—compare also his article on *εἰ* in L. and S., 1883—Professor Clapp has renewed the attack in the *Transactions of the Am. Phil. Association* for 1891, p. 86. It is true that he says that his independent "statistics are produced not with the purpose of opposing Gildersleeve's conclusion, but of defining the extent of its application." But he closes by saying that "it seems clear that this use of the future with *εἰ* can at best be nothing more than an ill-defined and unconscious tendency which is not followed with sufficient regularity either upon the positive or negative side to amount to a rule or even a fixed habit." If Professor Clapp is right, I have been guilty of a narrow and hasty induction, and within the sphere of my influence have done positive harm to Greek Syntax by crystallizing into a formula a set of phenomena which earlier students of the language had been content to note in passing,[*] and I deserve whatever punishment is due to rash and ill advised generalization. My paper was fairly exhaustive for the tragic poets, except the fragments, but as Professor Clapp claims that he has "collected and tabulated the whole body of usage" on this point and made "further cavil impossible," I have been glad to compare my collections with his; and in this comparison, as in the rest of the tedious work that Professor Clapp has made necessary, I have had the advantage of the careful and intelligent aid of Dr. C. W. E. Miller, so that the margin of error has been much reduced. It appears that Professor Clapp has cited 17 more instances of εἰ with future indicative in the tragic poets than are counted in my lists. But seven of these are gained by counting verbs, not clauses, as if every new verb in a sentence made a new conditional, viz. Ai., 1242, 1244, 1245, 1249, and O. R., 234, 890, 891; one example is counted twice, Cho., 558 (571), two I excluded because of doubtful reading, Med., 1109, 1298; one cannot be identified, Eur. Suppl., 557—eleven in all—thus reducing the accessions to six, for which I am duly grateful: S. c. Th., 99 (101)—which is elliptical—O. C., 1206; I. A., 947, 995; Heracl., 149—which has an interrogative squint,—and 506. The majority of the seventeen, so far as they are not μέλλω forms, are in my favor. On the other hand Professor Clapp has omitted five that are in my list, Pers., 355 (357); Eur. El., 336; H. F., 490; I. A., 1172; Ion, 1062; the majority of these being also in my favor. The true number lies midway between Professor Clapp's estimate and mine, but the percentage is not serious and does not affect the matter in controversy.

---

[*] In 1846.

[*] e. g. Kr. § 54, 12, 2—"leicht auch anwendbar wo man *die Wirklichkeit der Bedingung ablehnt* oder als zweifelhaft vorstellt." It was not in vain that Krüger had read Aristophanes four times for syntactical purposes in the month of August, 1840. (See Pökel, K. W. Krüger's Lebensabriss, p. 21.) Compare Classen on Thuk., 3, 2, 3: "*εἰ μή τις* mit dem Indic. Fut. häufig zum Ausdruck der Warnung," and Campbell on Plat. Theaet. 161 D. (2d ed. 1883). "The future indicative with *εἰ* is often used in dwelling on a supposition which is unendurable."

Having thus disposed of the collection, let us proceed to the tabulation, after correcting some other slips such as Hec(uba) for Her(aclidae), 272, 373, 652, 974, and Bacch. for Hel., 975. "There are," he says, "in the extant tragedies 231 protases of this sort. Of these 73 really express present intention and are equivalent to the corresponding forms of μέλλω with the infinitive. Fifty-six others seem to be in no respect different in meaning from ordinary future conditions with ἐάν and the subjunctive. Of the 102 which remain 44 are distinctly minatory, while 58 others express at least an undesirable alternative. If then we leave out of view those which are equal to μέλλω with the infinitive, the ratio between those which are minatory or unfavorable, and those which cannot so be interpreted, is 102 to 56. This would seem to go far towards proving that the form in question was consciously used by the tragedians as appropriate for carrying the solemn tone referred to."

But I am not satisfied with this concession, and do not intend to accept Prof. Clapp's 56 without examination. The 56 may after all be referable to other classes. In the first place, the 56 ordinary conditions are to be reduced to fifty-four by eliminating Cho., 558 (571), which Prof. Clapp has already counted among the unfavorable, and Eur. Suppl., 557, which cannot be identified. Of the 54 that remain, 22 are explained in my article under the categories that I recognize, and are thus differentiated from the ἐάν form. They are minatory; they are equivalent to μέλλω or δεῖ; they are dependent on verbs of emotion; they are mere *pro forma* conditions, and three are doubtful readings. Let us examine the 32 that remain. But here an embarrassment arises. Professor Clapp, as we have seen, does not seem to be clear in his own mind as to what is desirable or undesirable, and he has actually cited one example as both ordinary and unfavorable—Cho., 558 (571). Still we must take courage and appeal to the ordinary estimates of humanity and ask: If death (I. A., 1268), despair (Aisch. Suppl., 511; Heracl., 593; Or., 599), misery (Phoen., 244), worthlessness of life (Ion, 669), wrong-doing (Hel., 1011), repute of base conduct (Tro., 661), of horrid crime (Ion, 1024), if foolish speech (I. A., 654) and foolish conduct (Ion, 375), if failure in war (I. A., 296, 1262), if the abrogation of the worship of the gods (Ion, 445), the denial of their wisdom (I. A., 1190), the annulment of law and free course given to crime (Or., 566, 940)—if these things are not "unfavorable alternatives," what is unfavorable? These 17 reduce the 32 to fifteen, and of these 15 four belong to the familiar class of verbs of emotion (Eur. El., 263; Heracl., 739; Med., 346: φροντίς, εἰ [cf. Plat. Gorg., 502 E], I. T., 1412),* four may be classed under δεῖ and μέλλω (Ion, 648; Cycl., 475; Or., 1102; Rhes., 169), so that there is a remnant of seven only, which I should be glad to abandon to Prof. Clapp, if I could resist the impression that they are either sternly logical or naturally take a modal translation. They are Antig., 90, 234; Andr., 970; I. T., 999; Ion, 750; Or., 1212; Phoen., 725. It is evident from what has been shown above that even if Prof. Clapp insists on the minatory feature, on the unfavorable alternative, as the real test of what he chooses to call my doctrine, the figures are not 102 to 56 or rather 54, but show what Prof. Clapp would himself call an "overwhelming" preponderance. In fact it would be easy to make a strong fight for every one of the 54 as different from an ἐάν or ordinary condition, but as Prof. Clapp recognizes the validity of the smaller proportion, we can pass on to what he considers strong countervailing evidence against the formulae to which he desires to restrict me.

Of his 56 (54) he says seventeen show a possibility that is "ardently desired," and as he has exhibited a strange conception of the desirable and the undesirable, it may be instructive to examine these 17 somewhat more carefully, though, I repeat, it is not at all necessary to exclude the desirable* from the sphere of εἰ with the future indicative in order to maintain the severity of the tone. As I have pointed out before, the application of the logical condition, the application of a syllogism † to an impending problem of profound practical interest is of itself stern. So O. R., 844, cited by Professor Clapp, is one-half of a double future condition and the stern judicial impartiality with which Oedipus faces his doom adds a horror to the situation.‡ In O. C., 628, the μέλλω formula will answer (though there is a noteworthy variant ψεύδουσι) and the same may be said of Cho., 756 (775); Cycl., 475, and Or., 1102. Trach., 1246, in which οὐ δυσσέβεια = οὐκ αἰσχρόν, belongs to a familiar group as does Eur. El., 263 (ταρβῶν). In three of the passages, Phil., 353; Ion, 648; Or., 1212, the future is a half-quotation,§ clearly so in Phil., 353, where we have an optative. Solemn promise, solemn exhortation, prophetic tone are all discernible in O. C., 1340; Andr., 970; Hipp., 501; Ion, 750; Phoen., 725. In I. T., 999, the κινδύνευμα is καλόν, but it is a κινδύνευμα for all that, and it might be maintained that the word carries with it an interrogative notion as do words of fear (cf. Heracl., 149). But the crisis is a solemn one and that will suffice. Compare vv. 975, 985, and remember that we have to do with a promise already given in the context. As to I. A., 654: ἀσύνετα νῦν ἐροῦμεν, εἰ σέ γ' εὐφρανῶ,‖ I cannot for my life see that the apodosis is to be "ardently desired" by any searchers after truth, grammatical or other. "Talking nonsense" is a sad condition of giving joy to any one but a child or girl.

I think that I have now proved more than was required of me by the position taken up in my article, but Professor Clapp goes on to say that ἐάν with the subjunctive may be used in minatory conditions. Of course it can. That the Greek should use the milder form instead of the harsher is in consonance with the moderation of the race, and the examples cited by Professor Clapp, even if stringent, would not affect the theory of the tone of the future. In his treatise entitled *Syntaxis Aristophaneae capita selecta*, Professor Sobolewski, who has accepted in the main my views as to this construction, maintains that the minatory clause should be limited to the second person, and that Aristophanes employs in threats against a third person, ἐάν rather than εἰ with the future indicative, but only rather than εἰ, for he gives examples of εἰ, and in all the passages that he cites the metre is against εἰ. But Sobolewski's treatment deserves more serious consideration than I am disposed to accord to Professor Clapp's. Only it is worth noting that the Yale professor, in illustrating the indifference of εἰ and ἐάν, has, like the Moscow scholar, cited verses in which the metre excludes εἰ with the future. Of the *metri causa* argument I made short work in my first article by showing that the proportion of ἐάν to εἰ with the future in Aristophanes is the ordinary prose proportion, but the *metri causa* argument is legitimate for the weaker against the stronger, though not for the stronger against the weaker. To tone down a statement is more congenial to the Greek temper than to tone it up. I will not go through the list of Professor Clapp's minatory ἐάν's. It is utterly unnecessary from my point of view, though in one of the very first examples, Prom., 1014, it would not be hard to maintain that Hermes does not threaten but merely expostulates, and it may be worthy of note that he introduces his expostulation by one of the favorite imperatives of the Attic orators, not over prone to the use of imperatives.

I have been virtually accused of rash and hasty generalization. Which of us has been rash and hasty, Professor Clapp or I, will be apparent to any one who has followed these remarks. He has tried to tie me down to a narrow thesis which I never set up, and even on this basis he has failed to prove his statement—failed more signally than any critic I can remember.

---

*See Aken, *Tempus u. Modus*, p. 86. Cobet goes so far as to require the future (N. L., p. 380), which is too strict. Goodwin puts all the examples of verbs of emotion under the μέλλω group, in which he seems to be followed by Prof. Clapp.

*Cf. Thuk., 1, 141, 1: αὐτόθεν δὴ διανοήθητε ἢ ὑπακούειν πρίν τι βλαβῆναι ἢ εἰ πολεμήσομεν ὡς ἔμοιγε ἄμεινον δοκεῖ εἶναι κτέ.

† Luc. Vit. Auctio, 23 [I, 564, R.] εἰ τὸν πρῶτον τόκον λήψεται, λήψεται καὶ τὸν δεύτερον· ἀλλὰ μὴν τὸν πρῶτον λήψεται, λήψεται ἄρα καὶ τὸν δεύτερον.

‡ Cf. Plat. Lach., 179 D; Dem., 1, 19 and [13, 2].

§ Besides, ὁ λόγος καλὸς προσῆν is parallel with Tro. 890: αἰνῶ σε . . εἰ κτενεῖς δάμαρτα σήν which is classed under 'present intention' by Professor Clapp.

‖ Cf. Agathon fr. 12 (Nauck): εἰ μὲν φράσω τἀληθῆ, οὐχί σ' εὐφρανῶ, | εἰ δ' εὐφρονῶ τί σ' οὐχὶ τἀληθῆ φράσω.

That εἰ with the future indicative is used by preference in a stern sense, in minatory and monitory connexions, is evident to any one who will study the monuments of the language; and I showed in my former article that the phenomena in the tragic poets were not isolated. If they had been, they might have been accidents. But the whole history of the language favors the theory of the stern character of εἰ with the future indicative. Homer does not make much use of the form, it is true, but see the examples in Ebeling's Lexicon Homericum. How many of them fall outside of the categories in controversy? Pindar has not a solitary clear εἰ with future indicative. Why should he? What had he to do with menace? How much with gloom? Not a solitary clear εἰ with future indicative did I say? Yes, there is one in his famous fragment on the Eclipse of the Sun (107 Bgk.), and that εἰ with future is in line with the horror of the occasion. I have before me a complete collection of εἰ with the future indicative in Herodotos, made by my former pupil, Dr. Lodge.[*] Thirty-two out of the thirty-nine examples recorded are as gloomy as one can desire. To be sure one must not pop into the text, pick out a gloomy word here and a bright one there. The whole situation must be studied,[†] and then Artabanos' μαθητέον, Hdt., 7, 16, 3, will be dismal enough. Thukydides is true to the rule, truer even than I thought sixteen years ago, when I made a rough count of the conditionals in the speeches. Now I have before me a more exact list of all the εἰ with the future indicative conditionals, prepared by my friend Professor Hogue, some 103 in all. They are not all conditionals. Some may be classed as interrogative, some are mere *pro forma* conditions, but of the 90 odd that are clearly conditional, the vast majority, including μέλλω conditions and conditions with verbs of emotion, carry with them an unfavorable alternative, and not more than five or six per cent. can be wrested from the sinister meaning that lies in the form, and which is so appropriate to the great tragedy of the Peloponnesian War. I give Professor Hogue's list. Let it be tested for the "ill defined tendency" of which Professor Clapp speaks.[‡]

Xenophon is true to the rule. Plato is true to it. The orators are true to it. And the later Greek stylists, such men as Dio Chrysostomos and Lucian, observe it with remarkable fidelity, and I might fill pages with sporadic examples, if it were worth while. In fact it is only the divergencies from the rule that are interesting. But I forbear, especially as I may have to consider the subject again for a higher purpose than that of repelling an attack on my methods of investigation.

In the sixteen years that have elapsed since I wrote my article on ἐάν with the subjunctive, and εἰ with the future indicative in the Tragic Poets, much progress has been made in Greek syntax, and my own article would assume a different form in more particulars than one if I had to write it over again. I should discuss more fully than I did the modal character of the future in which Aken saw long ago the secret of the behavior of the tense in dependent clauses (*Temp. u. Mod.*, p 17).[§] I should explain the absence of the future indicative from the temporal sentence as exclusion rather than banishment. I should not consider ὅταν with the present and ὅταν with the aorist a bifurcation of ὅτε with future indicative, but rather as the earlier forms in the face of which ὅτε with the future indicative could not find a lodgment, but my induction from the use in the tragic poets will retain its value until death and failure lose their tragic significance. The harshness of the logical condition is no fancy, the μέλλω group which forces the future into the present is stern and the verbs of emotion are almost exclusively verbs of fear and shame, so that the assault on my position has only strengthened it.

In the opening sentences of his paper Professor Clapp makes use of an unfortunate expression. He speaks of "brilliant labors." There is no such thing as "brilliant labor." Labor is a homely thing, and without labor one cannot achieve even a brilliant failure.

Notes on the Theory of the Transformer. By Henry A. Rowland.

As ordinarily treated the coefficient of self and mutual induction of transformers is assumed to be a constant and many false conclusions are thus drawn from it.

I propose to treat the theory in general, taking account of the hysteresis as well as the variation in the magnetic permeability of the iron.[*]

The quantity p as used by Maxwell is the number of lines of magnetic induction enclosed by the given conductor. This will be equal to the number of turns of the wire into the electric current multiplied by the magnetic permeability and a constant. But the magnetic permeability is not a constant but a function of the magnetizing force, and hence we must write

$$p = Bny + C(ny)^3 + \delta(ny)^5 + etc.$$

Where B, C, *etc.* are constants, n is the number of turns and y the strength of current.

In this series only the odd powers of y can enter in order to express the fact that reversal of the current produces a negative magnetization equal in amount to the direct magnetization produced by a direct current. This is only approximately true, however, and we shall presently correct it by the introduction of hysteresis. It is, however, very nearly true for a succession of electric waves.

To introduce hysteresis, first suppose the current to be alternating so that $y = c \sin(bt + e)$ where t is the time and e the phase. The introduction of a term $A \cos(bt + e)$ into the value of the number of lines of induction will then represent the effect very well. But the current is not in general a simple sine curve and so we must write

$$y = a_1 \sin(bt + e_1) + a_2 \sin(2\,bt + e_2) + a_3 \sin(3\,bt + e_3) + .$$

In this case it is much more difficult to express the hysteresis empirically. In most cases the first term in the value of y is the largest. A term of the same nature as before will, in this case, suffice to express the hysteresis approximated. We can then write for the total flux of magnetic induction

$$p = A \cos(bt + e_1) + Bny + Cn^3y^3 + \delta n^5y^5 + etc.$$

Problem 1.—To find the electromotive force necessary to make the electric current a sine curve in a transformer without secondary. Let the resistance be R, and make $y = c \sin(bt)$. Then Maxwell's equation becomes

$$E = Ry + n\frac{dp}{dt}.$$

Substituting the value of y we have

$$E = (Rc + Abn)\sin(bt) + Bncb\cos(bt) + 3\,Cn^3 \sin^2(bt)\cos bt + etc.$$

But

$$\begin{aligned} \text{Sin}\,^2bt \cos bt &= \tfrac{1}{4}(\cos bt - \cos 3\,bt) \\ \text{Sin}\,^4bt \cos bt &= \tfrac{1}{16}(\cos 5\,bt - 3\cos 3\,bt + 2\cos bt) \\ \text{Sin}\,^6bt \cos bt &= etc. \end{aligned}$$

Hence the electromotive force that must be given to the circuit must contain not only the given frequency of the current but also frequencies of 3, 5, 7, etc. times as many. In other words the odd harmonics.

Problem 2.—Transformer without secondary, the electromotive force being a sine curve.

$$E \sin bt = Ry + n\frac{dp}{dt}.$$

---

[*] I, 32, 13; 32, 37; 71. 14; 109, 7; 109, 12; 207, 14; 212, 12; II, 11, 15; 13, 18; 14, 6; 17, 6; 99, 14; 121 γ 13; III, 36, 25; 71, 17; 73, 2; IV, 33, 20; 125, 16; 163, 11; VI, 9, 20; 11, 10; VII, 9, 7; 10 θ 9; 11, 11; 16 γ 10; 16 γ 13; 46, 9; 50, 8; 161, 17; 172, 13; 209, 16; 236, 8; 236, 15; VIII, 3, 3; 62, 3; 108, 11; 112, 5; IX, 2, 9; 21, 10. (To facilitate reference the lines of the Teubner text have been added).

[†] Cf. Thuk., 4, 37, 1: γνοὺς δὲ ὁ Κλέων καὶ ὁ Δημοσθένης ὅτι εἰ καὶ ὁποσονοῦν μᾶλλον ἐνδώσουσι, διαφθαρησομένους αὐτοὺς ὑπὸ τῆς σφετέρας στρατιᾶς (that is precisely what the Athenian generals did not want) ἔπαυσαν τὴν μάχην.

[‡] I, 32, 1; 32, 5; 35, 3; 36, 3; 40, 3; 40, 6; 42, 1; 52, 1; 53, 4; 68, 3; 73, 2; 77, 6; 80, 4; 81, 3; 81, 4; 81, 5; 82, 1; 82, 5; 118, 3; 121, 5; 122, 2; 124, 1; 137, 2; 140, 5; 141, 1; 142, 4; II, 20. 3; 53, 3; 64, 1; III, 2, 3; 12, 2; 13, 6; 14, 1; 28, 1; 32, 2; 37, 3; 39, 7; 47, 3; 56, 3; 57, 1; 58, 5; 84, 3; IV, 37, 1; 60, 1; 68, 6; 83, 5; 85, 5; 87, 2; 87, 3; 120, 3; V, 14, 4; 26, 2; 30, 1; 46, 4; 56, 2; 57, 1; 64, 1; 104; 104 (elliptical); 111, 2; VI, 6, 2; 18, 3; 18, 4; 30, 2 (fut. opt.); 33, 4 (elliptical, Classen supplies δοξω λέγειν); 34, 2; 31, 5 (fut. opt.); 38, 4; 40, 1; 60, 4; 62, 1; 69, 3; 80, 2; 80, 3; 80, 4 (bis); 86, 1; 86, 5; 87, 4; 91, 1; 91, 3; 91, 4; VII, 5, 4; 8, 1; 13, 1; 14, 3; 42, 2; 60, 2; 64, 1; 73, 1; VIII, 43, 3; 45, 5; 47, 1; 53, 2 (bis); 53, 3; 55, 2; 83, 3; 86, 7; 91, 2; 91, 3; 96, 3; 109, 1.

[§] Rutherford, *First Greek Syntax*, § 285, recognizes "a very marked difference of meaning" which he brings out by an emphatic "will" translation. Riemann and Cucuel, to whom R. acknowledges his obligations, say: "Il semble que εἰ joint à l'indicatif futur s'emploie surtout volontiers dans les menaces" after von Bamberg, § 105.

[*] The problem is treated by the method of magnetic circuit first applied by me to iron bars in my paper on "Magnetic Distribution" (Phil. Mag., 1875) and afterwards to the magnetic circuit of dynamos at the Electrical Conference at Philadelphia in 1884. I also used the same method in my paper on magnetic permeability in 1873.

First it is to be noted that when we place in this equation the general value of y and make the coefficients of like functions, of bt zero, all the even harmonics will strike out.

Hence the value of the electric current will be

$$y = a_1 \sin(bt + e_1) + a_3 \sin(3bt + e_3) + a_5 \sin(bt + c_5) + .$$

Substituting this value in the value for p, the equation is theoretically sufficient to determine a_1, a_3, *etc.*, and e_1, e_3, *etc.* The equations are cubic or of higher order and the solution can only be approximate and I have not thought it worth while to go further with the calculation. However, it is easy to draw the following conclusion:

1. A simple harmonic current through an iron transformer will produce a secondary electromotive force and current, or both, which contain not only the fundamental period but the higher odd harmonics.

2. This effect is *not* due to hysteresis but to the variation in the magnetic permeability.

3. The harmonics increase with the increase in magnetization of the iron and nearly vanish as the magnetization decreases, although it is doubtful if they ever quite vanish. Hence, an increase of resistance will decrease the harmonics.

4. In the method of introducing the hysteresis into the equations, it enters as an addition to the resistance in the term $Ra_1 + Anb$, where R is the resistance, a_1 the maximum current, A the coefficient of hysteresis, which is dependant upon the amount of magnetization of the iron, n the number of turns of wire, and $b = \frac{2\pi}{T}$ is 2π divided by the time of a complete period.

The introduction of the hysteresis into the ordinary equations, therefore, presents little or no difficulty.

Many observers have noted that the current curve in a transformer was not a sine curve and Prof. Ayrton has shown the presence of the odd harmonics but gives no explanation. Mr. Fleming has attributed them to hysteresis, but I believe the present paper gives the first true explanation.

Problem 3.—To find the work of hysteresis. Let the resistance, R, be zero. The work done will then be the integral of the current times the electromotive force, or

$$w = \int y \frac{dp}{dt} dt$$

the integral to be taken for one period of the current.

$$w = \int_0^{\frac{2\pi}{b}} \left[A \sin(bt + e_1)\, y + Bny \frac{dy}{db} + Cn^3 3 y^2 \frac{dy}{db} + \right] dt$$

$$w = A \frac{\pi}{b} a_1.$$

All the other terms are zero.

In a unit of time the energy absorbed is

$$\frac{Aa_1}{2}.$$

Steinmetz has found by experiment that this varies as the $1\frac{6}{10}$ power of the magnetic induction. Of course the present theory gives nothing of this but only suggests a way of introducing the hysteresis into calculations of this nature. For this purpose replace A by $A^1 a^{.6}$ and the work of hysteresis becomes $\frac{A^1}{2} a_1^{1.6}$ which is thus the formula of Steinmetz.

In the case where a secondary exists the number of turns of wire being n^1 and the current y^1, we have simply to replace ny in the above formula by $ny + n^1y^1$ and change the phase of the hysteresis term so as to be 90° from the combined magnetizing force, $ny + n^1y^1$. The equations of the currents will then be, by Maxwell's formula,

$$E = Ry + n \frac{dp}{dt}$$

$$O = R^1y^1 + n^1 \frac{dp}{db}.$$

Which suffice to determine both y and y^1. The result is too complicated to be attractive. The equations show, however, that the odd harmonics must appear in either the electromotive forces or the primary or secondary currents, if not in all of them at once. The exact distribution is only a case of complicated calculation.

It is to be specially noted that all formulae by which self induction is balanced by a condenser will not be correct when applied to an iron transformer but only to an air transformer. They will, however, apply approximately to iron transformers in which the magnetization is small and thus probably will apply better to transformers with an open magnetic circuit than with a closed one.

Also an iron transformer should not be compared with an air transformer or two iron transformers with different magnetizations with each other.

In conclusion I may add that the mathematical difficulties might be overcome by another mode of attack but other work draws me in another direction and I leave the matter to be worked up further by others.

Investigations on the Double Halides.

The February number of the *American Chemical Journal* consists of a series of articles on the subject of the Composition of the Double Halides. The investigations, the results of which are recorded in these articles, have been carried on during the past three years under the guidance of Professor Remsen by G. M. Richardson, C. H. Herty, C. E. Saunders, C. P. Brigham, and J. E. Gilpin. They have to do with the double halides of tin, lead, manganese, antimony, and bismuth, and with mercurous hyposulphochloride. The double halides form a large class of compounds, numbering from four to five hundred, which have hitherto, for the most part, been much neglected, for the reason that they seemed not to conform to the laws that govern most other chemical compounds, and their existence could not be accounted for by the commonly accepted theory. In an article published three years ago (*American Chemical Journal*, XI, 295) Professor Remsen discussed these compounds at some length. He showed that a comparatively simple law governs their composition, that they are in all probability analogous to the better known oxygen compounds, and that by a slight extension of our present theory their existence can be explained as easily as that of the oxygen compounds. On testing the law of composition by a comparison with all the cases recorded in the literature, a few exceptions were found described, and these investigations were undertaken with the object of determining whether the exceptional compounds exist or not. The result is that the law of composition pointed out by Professor Remsen three years ago has been confirmed. The exceptional cases have disappeared. Greater care in the preparation and separation of the salts, as well as more accurate analytical methods, have shown that the compounds which appeared anomalous are incapable of existence as chemical individuals. Further work of revision is in progress in the laboratory.

W. W. R.

The Saga of Walther of Aquitaine. By MARION DEXTER LEARNED.

[Abstract of a Treatise published in the Publications of the Modern Language Association of America, Vol. VII, No. 1, 212 pp.]

The Saga of Walther of Aquitaine occupies a prominent place among the great Heroic Sagas of Germany. Its popularity and importance in the mediaeval literatures of Europe are attested by the diversity of versions and tongues in which it has been preserved—the Anglo-Saxon Waldere fragments (MS. of ninth century), the Latin Waltharius (a poem in hexameter verse written by Ekkehard I, of St. Gall, c. 920–930), the Italian or Novalician version in prose, with extracts in verse from the Waltharius, (preserved in the Chronicon Novaliciense of the first half of the eleventh century), the poem Walther und Hildegunde of Walther von der Vogelweide (evidently a reference to the Saga). The Nibelungenlied, the Graz and Vienna Fragments (of a M. H. German Epic of Walther and Hildegunde, written in a peculiar variation of the Nibelungen strophe in the thirteenth century), the Middle High German Epics Biterolf und Dietleib, Alphart's Tod, Dietrich's Flucht, Rabenschlacht, and Rosengarten (all of the thirteenth century), the M. H. G. poem, 'Von dem übelen Wibe,' (the Old French 'Chanson de Roland,' and the German 'Rolandslied'?), the Old Norse Thidrekssaga or Wilkinasaga (a thirteenth century prose version of the Saga of Theoderic the Great or Ostrogoth), and the briefer recension of the same in Old Swedish (made between 1449–1476), the Latin Chronicle of Boguphalus, Bishop of Posen (d. 1253), and the later Polish versions of Paprocki (Krakau, 1584), Bielski (1597), Niesiecki (1743), Procosius (Chronicon Slavo-Sarmaticum), and Wojcicki (1851).

The treatise before us offers for the first time all these various versions in the original texts in chronological order, thus presenting the Saga in its transmitted form as a basis for historical treatment. The point of view and method of handling are historical. The aim of the treatment is to show that the Saga is the outgrowth of a historical past, and thus to rescue it from vague mythical interpretations. Only by closely adhering to the historical method and keeping in view the historical background, can a *Saga Science* become possible.

The second part of the work addresses itself accordingly to the discussion of the most important problems connected with the Saga—the Relation of the Versions, the Origin of the Saga, the Nationality of the Hero. By the aid of the new and exhaustive analysis of the versions and the comparison of the essential episodes as presented in each form of the Saga, the treatment is greatly facilitated.

It is remarkable that with so great a number of variant details the chief episodes of the Saga are preserved in each of the three principal saga-forms around which the versions are grouped—the Alemannic, the Norse, the Polish. These episodes are:

a. Walther's sojourn at a foreign court.
b. Walther's betrothal with Hildegunde at court.
c. Flight of Walther and Hildegunde.
d. Pursuit of the fugitives.
e. Walther vanquishes his foes in single combat.
f. Walther and Hildegunde return home.
g. Walther's exploits after his return.

The following *historical characters* are clearly recognizable in the characters of the Saga: Attila, King of the Huns, corresponding to Attila and Etzel of the Saga; Kreka, his queen, to Erca, Hercha, Helche; Ermanric, King of the Goths, to Ærminrikr; Theoderic, the Ostrogoth, to Deodric, Dietrich and Thiðrekr; Gibica, King of the Burgundians, to Gibico and Gibicho; Gundicarius, also King of the Burgundians at the time of their overthrow by the Huns, the epical period of their history, to Guðhere, Guntharius. Moreover, the characters designated as *legendary*—Hagen, Heriricus, Hildegunde, Alphere, Walther; and the eleven Knights, who attack Walther in single combat at the Wasgenstein—if not definitely traceable in historical record, are at least the outgrowth of the historical past, and not inventions, pure and simple. Hagen, whom Heinzel identifies with Aëtius, has characteristics found in Aigyna, the "noble Saxon," who guarded the Frankish frontier along the Garonne against the Wascons (625); Heriricus is probably the legendary reminiscence of Chararicus, King of the Morini and one of the rivals of Chlodowech, confused in the popular mind perhaps with Chararicus, King of the Suevi in Spanish Gallicia; Hildegunde belongs also to Frankish-Burgundian soil and reflects actual history; Alphere furnishes possibly the lost link between the Saga of Walther and the Lombard Walthari.

The original of Ekkehard's Waltharius was an alliterative German poem. Proofs of this are, 1. traces of alliteration in the Waltharius, 2. the actual existence of such alliterative poem of the Saga preserved in the Anglo-Saxon Waldere, 3. the survival of the Saga in the heroic form of the M. H. G. epic, as found in the Graz and Vienna Fragments, 4. the indirect evidence derived from the association of this Saga with other M. H. G. epics, as Nibelungenlied. This original of Ekkehard I. was the Upper German (Alemannic) form corresponding to the Low German form as found in the Waldere Fragments and was nearly contemporary with the latter. The Novalician version is a fusion of the local tradition of a monk Waltharius and the account of Ekkehard. It is possible that the Novalician account contains reminiscences of a Lombard Saga of Walther. The Graz and Vienna Fragments are probably survivals of the original popular form of the Saga, of which the Waldere Fragments are the Low German (Saxon) version. The Thidrekssaga is a thirteenth century prose combination of Low German (Saxon) poetic and prose accounts and possibly fresh importations from the South of Europe. The Polish form of the Saga presents a fusion of two heterogeneous parts, a foreign (German) and a native (Polish). The German account may have reached Poland through Hanseatic intercourse via Novgorod or by direct intercourse between Poland and Germany after 962. There is no good evidence that the Saga existed in Poland before the time of Otto the Great.

Mythical interpretations of Walther are inconsistent with the historical background and character of the Saga. The conception of Walther as an "ideal figure" is not in keeping with the real and serious character of the early Heroic Saga. The essential elements of the Walther Saga belong to middle or second half of the fifth century, and the fact that the Waltharius, so faithful in its historical outlines, calls Walther an Aquitanian, directs us to Aquitania as his native land. Thus Walther in the earliest form of the Saga must have been *politically a Germanic-Aquitanian under West Gothic supremacy.*

After tracing the various conceptions of the hero through the versions the treatise concludes:

In the course of the discussion based upon a score of clearly defined literary survivals of the Walther Saga, we have shown that the elements of the Saga are essentially historical, belonging, for the most part, to the period of the heroic struggle of the Germanic peoples of the west with the Huns; that the original form of the Saga developed as early as the fifth century; assumed in the Waltharius a strongly Frankish-Burgundian color of the Merovingian time; became the theme of a M. H. G. epic; was connected with the great heroic cycles of the Nibelungenlied, with the epic accounts of Ermanric, Theoderic and Charlemagne. Thus we have justified the view that Walther of Aquitaine belongs to the historical group of heroic characters with whom all mediæval tradition associated him and not to the realm of myth and fable.

Recent Contributions to Meteorology. By Professor CLEVELAND ABBE of Washington.

[Extract from an address before the University Scientific Association, December 16, 1891.]

Climatology may be considered as the study of the influence of the sun, the earth and the atmosphere upon animal and vegetable life. It is really a distinct application of the wider study which we call meteorology. It has such intimate connections with biology that I should put it into the biological half of the general subject of physical geography. It is only in its broadest sense that climatology takes into consideration those features of the weather that affect commerce and business, such for instance as destructive winds, hail, lightning. In a general way we would say that by the climate of a place we understand those features of the weather that in any way affect human life and industry; therefore the study of climate is auxiliary to the study of crops, commerce, history, ethnography, botany, zoölogy, in short every animal and vegetable activity. Those who are fond of the biological or human aspect of the face of nature will therefore pass from physical geography to the study of climatology.

But the atmosphere presents to us a purely material and mechanical aspect, and it is this which rivets the attention of the physicist properly so-called. He views the storms thundering over his head, the floods devastating the earth, the droughts destroying the crops, the hurricane lashing the ocean, and asks is there not order and law in the midst of this confusion? It is for such a physicist, for the meteorologist proper, for him who would understand the daily weather map and would predict the weather from day to day on a rational basis, as the engineer predicts the performance of his unbuilt engine or the chemist the behavior of some novel untried combination, that I would plead. For such a one you need a collegiate course that shall be a slight modification of your "second group" or your "regular mathematical physical course" as at present organized. Follow this up by a further recognition of *dynamic meteorology* as one of the subjects on which candidates for the degree of "Doctor of Philosophy" may prepare for examination and you have solved the problem as to what this university can do to provide for the meteorological needs of this country. The mere statement of these subjects: the three lines of type that show the student what he may study if he will—serve as a sufficient stimulus, if his bent is in that direction. . . . . . .

But we need not stop now to discuss the details of courses and classes. There is an abundance of work to be done both mathematical and experimental. You will perhaps notice with interest that the courses and the laboratory work that bear on the study of the atmosphere are almost the same as those that one would naturally take up if he were preparing to be a hydraulic engineer, and this may give additional security to the minds of those who while pursuing the whole course of study will sometimes inevitably wonder what opening there may be for the exercise of their talents and the application of their hard-earned knowledge. Certainly the country has great need of skilled hydraulicians. The care of our rivers and harbors, the building of our aqueducts, the development of our water-powers, the problems of navigation on rivers, canals, oceans and in the air itself, offer an immense field for engineering skill and for the application of the same laws as those that control atmospheric phenomena. Up to a certain point therefore, the hydraulic engineer and the meteorologist must pursue their studies side by side. By so much the more, therefore, am I emboldened to present to you a glimpse of the present stage of development of meteorology in hopes that some of you may have the opportunity of mastering the details and contributing to the progress of this important study to which indeed the name of science was denied a generation ago but which can now be no longer excluded from that brotherhood.

I may begin by calling your attention to the fact that this atmosphere is both the birthplace and the grave of the human race. When the green sod covers a handful of dust, and a monument recalls the memory of him who lies buried beneath, his vanished form has already escaped back to the air from which it came and joined the mixture of gases that surrounds us. Of these gases, the nitrogen, the oxygen and the aqueous vapor are those that mostly concern meteorology. The fundamental question to be resolved in the study of the mechanics of the atmosphere, consists in determining what the general motions of the air must be under the influence of gravitation and rotation of the earth: evaporation and condensation of moisture; absorption and radiation of heat; the irregularities of oceans and continents, hills and valleys. You will, of course, perceive at once that if there were no solar heat the temperature would be fairly uniform at all altitudes, the earth and the sea would be frozen, there would be no clouds, and the atmosphere would be a stagnant layer revolving with the globe to which it adheres.

Professor William Ferrel, a native of Pensylvania, was the first to solve approximately the equations of motion and deduce some of the phenomena which observation shows actually exist. He proved first that all bodies in motion on a rotating surface would be deflected to the right in the northern hemisphere, and that a pressure in that direction would therefore accompany any effort to make the body move in a straight line. In consequence of this deflection a belt of low pressure must exist around the earth at the equator and areas of low pressure at the poles with a special area of high pressure at the tropics. Among the equations of fluid motion Ferrel included the "equation of continuity" so-called, but showed that the general solution of the problem as thus stated analytically was impracticable; he therefore took as a special solution the observed pressures and temperatures all over the globe and showed what the relative velocities must be both for the lower winds and the upper atmospheric currents. He then proceeded to a discussion of the temperatures, pressures and winds that must be experienced within a region of abnormally high or low pressure such as we now call cyclones or anti-cyclones. He derived the formula connecting the intensity of the barometric gradient, such as you see it daily on our weather maps, with the winds that cut across it diagonally.

Ferrel's next memoir took up the thermo-dynamic problems, especially those that Espy had seen to be the important factors in the development of our thunderstorms, namely that ascending air expands and by virtue of its expansion is cooled throughout its whole mass to an extent easily calculated by the laws of thermo-dynamics, and that when cooled below the dew point a formation of fog and cloud must result giving rise to an evolution of heat and a delay in the cooling process, so that the moist air is warmer than dry air would have been. Thus a cloud once formed becomes a centre of aspiration, so that clouds and storms grow as long as they are supplied with uprising currents of moist air. Ferrel reduced to formulae and figures the general doctrines of Espy and showed them to be perfectly applicable to a certain class of our storms, namely those in which the ascent of air is sufficiently rapid to render the radiation of heat and the mixture of surrounding air matters of secondary importance.

The general treatise of Professor Ferrel entitled "Recent Advances in Meteorology," published by the Signal Office in 1885, gives most of his earlier results with many revisions and new ideas.

Very similar results were published by Oberbeck in 1882 and 1888, employing more elegant mathematical methods and advancing a step beyond Ferrel's first publications. It may, however, be stated that the general solution of the hydro-dynamic equations pre-supposes a definite knowledge of the distribution of temperature or of density in the atmosphere; and of course the solutions given by Oberbeck are intended to apply only to the atmosphere as we observe it.

The thermo-dynamic phenomena attending the ascent and descent of the air have been treated by many authors analytically, such as Sir William Thomson, Reye, Chambers, Hann, Guldberg, and Mohn and especially by Ferrel; within the last few years this subject has been worked out in a very elegant, graphic way by Herz and Bezold.

The memoir of Herz considers only adiabatic changes while the memoir of Bezold considers the changes that are not strictly adiabatic. It is evident on a slight consideration that the quantity of heat within a given mass of air is continually changing by reason of several processes, *first* the direct absorption from the sun, *second* radiation to colder objects, *third* the loss by convection of heat attending the precipitation of rain or snow, *fourth* the gain by convection attending evaporation from the earth into the air, *fifth* by the process of mixture that is constantly going on. Therefore atmospheric processes are by no means always adiabatic, and Bezold's graphic methods enable us quickly to solve any problem that may be presented. Bezold and Helmholtz have agreed in adopting and recommending the term "potential temperature" as defining the temperature that a mass of gas would have if brought to a normal pressure, without loss or gain of heat.

Helmholtz has during the past two years added greatly to our knowledge of atmospheric movements by his studies on the conditions of stability among masses of air that have discontinuous motion, such as two vortex rings encircling the earth in different latitudes and having different temperatures. In general, stable equilibrium is possible only when the warm ring is on the polar edge of the cold ring.

A pupil of Helmholtz, Professor Diro Kitao of the Imperial Academy of Agriculture of the University at Tokio, has made an elaborate study of the forms of motion that attend the meeting of two horizontal currents which then pile up and roll back on themselves.

Finally, Helmholtz has given us the very remarkable memoir on waves in the atmosphere and the distribution of energy in the winds and the ocean-waves.

The so-called "convection theory of storms" which we call Espy's, assumes that the latent heat of vapor is the maintaining power while the original ascent of the moist, warm air is due to its density. Therefore, we could have no cyclonic motion without ascending moisture and clouds. But the studies of Hann and Helmholtz have, I think, put it beyond doubt that there is another equally important cause at work, which undoubtedly is the fact that the upper air flowing northward from the equator as a return trade is slowly cooling by radiation and descending. It eventually reaches the earth here and there in spots which are small areas of clear sky in the tropical regions, but are large areas of cold dry air and high pressure in northern latitudes. If the air is cooled by radiation faster than it is warmed up by the compression of its slow descent, then it reaches us as clear, cold and dry air, and only after reaching the earth's surface does it begin to warm up again in the daytime faster than it can cool at night. As this dry cold air under-runs the moist warm air at the earth's surface, or as two areas of high pressure flowing towards each other must lift up the lighter air between them and set it into cyclonic rotation, we must, therefore, recognize the general conclusion that Espy's aspiration cyclone as developed by Ferrel is not the only form of cyclone, but that those due to descending cold air and, therefore, having the general circulation of the atmosphere as their fundamental cause are equally entitled to consideration.

To this last and latest development from the theoretical side, I need only add that the study of the motions of the clouds has enabled me to assert confidently that there is no form of motion known to the student of mechanics of fluids but what is to be found beautifully illustrated in some important phenomenon of the atmosphere. The experiments on the motions of water and of air and the measurements thereon that you may make in a well appointed physical laboratory are repeated by nature on a large scale in the atmosphere.

I will only detain you by giving one illustration of this statement. You have all seen the beautiful standing waves on the surface of a little stream of water flowing over a rocky bed. The theoretical study of these waves began with Bidone early in this century and has been especially prosecuted by Bazin and Boussinesq in France and Sir William Thomson in Scotland. Precisely similar waves must occur in the atmosphere but can only become visible to us by the formation of clouds at the summit of each wave if the air rises high enough. They are forming invisibly over our heads all the time. It was my good fortune to make an extensive series of observations on a remarkably well-developed system of standing waves capped by clouds, which perpetually extend from the summit of Green mountain on the Island of Ascension to the leeward for a hundred miles under the influence of the steady southeast trade-wind. These become invisible when the air becomes a little cooler or dryer and consequently they actually disappear every night only to reappear as regularly every day.

But I need not dwell any longer on the relations of the theoretical and the actually observed motions of the atmosphere. Our interest in the meteorological or dynamical theories and their application to the atmosphere is not inferior to our interest in any other physical science.

The possibility of making accurate long-range predictions of the weather and the seasons is recognized as already almost within our grasp and is an ultimatum that should fire the zeal of every young physicist.

Meteorology has advanced far beyond the stage of observation and generalization. We have had our Newton, Laplace, Dove, Espy, Ferrel, Oberbeck and Helmholtz and Thomson. Their work and our problems invite your attention.

You will perhaps recall that in 1868, as Director of the Observatory at Cincinnati I announced that our duty must be to encourage equally scientific investigation and the practical application of our knowledge and that with the help of the daily weather map I would undertake to make fairly accurate daily predictions of the weather. We now see that feeble effort expanded into our Government Weather Bureau and fifty other government weather bureaus throughout the world. Our international map of the northern hemisphere has in the hands of Poincaré thrown a clear light upon the question of the tides in the atmosphere. Our daily map freely distributed to every man throughout the country gives each one valuable information with regard to his own local weather. The general results as to types of weather have been summarized by Loomis, Russell, Davis and others. We are now employing nearly 300 instructed observers and local forecasters throughout the country whose salaries range from $600 to $1500; about 85 inspectors and clerks at Washington with salaries from $900 to $1800 and about 18 higher officials with larger salaries.

In co-operation with the central Washington office there are about 40 State weather services with 2000 volunteer observers. Add to this 40 state agricultural experiment stations and you will see that here is a field of scientific work and an opportunity for the employment of your expert graduates. Here is a demand for young physicists that should not be overlooked by the faculties and students of our universities.

CATALOGUE

OF

RECENT METEOROLOGICAL WORKS,

Serving as a Nucleus for a Special Technical Library.

[Suggested by Professor Cleveland Abbe of the Weather Bureau,
U. S. Department of Agriculture.]

SECTION I.

GENERAL TREATISES: COLLECTED ESSAYS: REVIEWS OF PROGRESS: ANNALS OF METEOROLOGICAL BUREAUS.

ABBE, CLEVELAND. Short Memoirs on Meteorological Subjects. Translated by C. A. (*Smithsonian Report for* 1877, *Washington*, 1878.)

—— Summary of Progress in Meteorology and Terrestrial Physics.
1871–1878. (*In Baird's Annual Record of Science and Industry*, 1871–78.)—1879–80–81. (*Annual Report Secretary Smithsonian Inst.*, 1881, *pp.* 231–331.)—1880–81–82. (*Ib.*, 1882, *pp.* 365–457.)—1883. (*Ib.*, 1883, *pp.* 483–569.)—1884. (*Ib.*, 1884, *pp.* 257–432.)—1888. (Dynamic Meteorology.) (*Ib.*, 1888, *pp.* 355–424.)—1889. (See Curtis, Geo. E.)

—— Treatise on Meteorological Apparatus and Methods. (*Ann. Rep. Chief Signal Officer*, 1887, *part* 2, *Washington*, 1888.)

—— Preparatory studies for Deductive Methods in Weather Predictions. (*Ann. Rep. Chief Signal Officer*, 1889, *part* 2, *Washington*, 1890.)

ABERCROMBY, HON. RALPH. Weather, a popular Exposition of the Nature of the Weather Changes from Day to Day. (*2nd. Ed.*, *London*, 1888.)

ATTLMAYER, T. Handbuch der Oceanographie u. maritimen Meteorologie. (2 *Vols.*, 8vo, *Wien*, 1885.)

BEBBER, DR. W. J. VON. Handbuch der Ausübenden Witterungskunde. (2 *Vols.*, *Stuttgart*, 1885–86.)

—— Lehrbuch der Meteorologie fur Studirende und zum Gebrauch in der Praxis. (392 *pp.*, *Stuttgart*, 1890.)

—— Die Wetter Voraus-sage. Eine praktische Anleitung, etc. (*Stuttgart*, 1891.)

BERLIN: Abhandlungen der Konigl. Preuss. Meteorologischen Instituts: Band I. (*Berlin*, 1890.)

BOGUSLAWSKI, G. VON. Handbuch der Oceanographie. 1 Bd. Raumliche, physikalische Beschaffenheit der Oceane. (*8vo*, *xvii*, 400 *pp.*, *Stuttgart*, 1884.)

CURTIS, GEO. E. Progress of Meteorology in 1889. (*Ann. Rep. Sec. Smithsonian Inst.*, 1889, *pp.* 205–285.)

DURAND-CLEYE, ALFRED. Hydraulique Agricole et Genie Rurale. Lecons professées a l'Ecole des Ponts et Chaussées (redigées par M. Felix Launay): I. Météorologie. (2 *Vols.*, 8vo, *Paris*, 1889.)

FRANCE: Bureau Centrale Météorologique de France: Annales publiées par E. Mascart: (Published annually since 1880.) (*Paris.*)

GUNTHER, SIGISMUND. Die Meteorologie ihrem neuesten Standpunkte gemass, etc. (*pp.* 304, *Munich*, 1889.)

GUYOT, ARNOLD. Tables, meteorological and physical. Edited by William Libbey, Jr. (4 *ed.* 8vo, *xxv*, 838 *pp.* *Smithsonian miscellaneous collections*, *No.* 538. *Washington*, 1884.)

HAMBURG: Aus den Archiv der Deutschen Seewarte. (Annual of the Deutsche Seewarte: Vols. I–XIII.) (*Hamburg*, 1878–1891.)

HANN, JULIUS. Handbuch der Klimatologie. (8vo, *pp. x*, 764. *Stuttgart*, 1885.)

—— Die Erde als Welt-Korper, ihre Atmosphäre u. Hydrosphäre. (*Prague u. Leipsic*, 1884. *Special Reprint from Hann, Hochstetter u. Pokorny Allgemeine Erdkunde.*)

HAUGHTON, REV. SAMUEL. Six Lectures on Physical Geography. (*Dublin and London*, 1880.)

HELLMANN, GUSTAV. Repertorium der deutschen Meteorologie. Leistungen der Deutschen in Schriften, Erfindungen und Beobachtungen auf dem Gebiete der Meteorologie u. des Erdmagnetismus von den altesten Zeiten bis zum Schlusse des Jahres, 1881. (*8vo*, *pp. xxii*, 995, *Leipsic*, 1883.)

HOUZEAU, J. C. et LANCASTER, A. Traité de Météorologie. (*Mons*, *Paris*, 1883.)

INDIA: Indian Meteorological Memoirs. Under direction of H. F. Blanford. (*4to.*, *Calcutta*, 1882–1891.)

JAMES, BUSHROD W. American Resorts and Notes upon their Climate. Chap. xii, 174–270 is a portion of Woeikoff's "Die Klimate der Erde" translated by S. Kaufmann. (*Philadelphia*, 1889.)

JELINEK CARL. Anleitung zur Ausfuhrung meteorologischer Beobachtungen nebst einer Sammlung von Hulfstafeln, neu herausgegeben und umgearbeitet von Dr. J. Hann. (*8vo*, 2 *pts.*, 80, 105 *pp.*, *Wien*, 1884.)

KLEIN, H. J. Allgemeine Witterungskunde. (12*mo.*, 260 *pp.*, *Leipzig u. Prag*, 1884.)

—— Die Fortschritte auf dem Gebiete der Meteorologie. Separate print from the "Vierteljahrs Revue der Wissenschaften," Edited by Dr. H. J. Klein. (*Cologne u. Leipzig*, *No.* 1, 1872, *Leipzig*, 1873; *No.* 13, 1887, *Leipzig*, 1888.)

LOMMEL, PROF. D. E. Wind und Wetter. (*Munich*, 1875.)

LONDON METEOROLOGICAL SOCIETY: Modern Meteorology: 6 Lectures. (*London*, 1878.) —(German edition by J. von Bebber, 8vo, *Braunschweig*, 1882.)

LOOMIS, PROF. ELIAS. A Treatise on Meteorology. (*New York*, 1868.) (*Last print*, 1882, *without material changes.*)

MARCHI, LUIGI DE, PH. D. Meteorologia generale. (*Milon*, 1888.)

MARIE-DAVY, H. Météorologie générale. Les Mouvements de l'Atmosphère et la Variation du Temps. (8vo, *Paris*, 1877.)

MILLER-HAUENFELS, A. R. Theoretische Meteorologie: ein Versuch die Erscheinungen des Luftkreises auf Grundgesetze zuruckzufuhren. Mit einem Begleitschreiben von Dr. J. Hann. (*8vo*, *p.* 129, *Wien*, 1883.)

MOHN, H. Les Phénomènes de l'Atmosphère. Traité illustré de Météorologie pratique, traduit par Decaudin-Labosse, précedé d'une introduction par H. de Parville. (*8vo*, 472 *pp.*, 24 *ch.*, *Paris*, 1884.)

—— Grundzüge der Meteorologie. (*4te. Auflage*, 8vo, *Berlin*, 1887.)

SCHMID, DR. E. E. Lehrbuch der Meteorologie. (*Leipzig*, 1860.)

SCOTT, ROBERT H. Elementary Meteorology. (8vo, *pp. xii*, 408, *London*, 1883.)

—— Weather Charts and Storm Warnings. (*3d. edition*, *London*, 1887.)

SIGNAL SERVICE, U. S. ARMY. Signal Service Notes. (*Nos. i–xx*, *Washington*, 1881–1885.)

—— Professional Papers of the Signal Service. (*Nos. i–xviii*, *Washington*, 1882–1885.)

—— Bibliography of Meteorology (Greely and Fassig.)
Part I, Temperature (*Washington*, 1887).—Part II, Moisture (*Washington*, 1889).—Part III, Wind (*Washington*, 1890).—Part IV, Storms (*Washington*, 1891).

SIGNAL OFFICE AND HARVARD COLLEGE OBSERVATORY. Meteorological Observations made on the summit of Pike's Peak, Colorado. (*Ann. Ast. Obs.*, *Harvard College*, *Vol. XXII*, 475 *pp.*, *Cambridge* (*Mass.*), 1889.)

TACCHINI. Ufficio Centrale di Meteorologia. (*Annali.*, *series* i, 1871–80, *Annali.*, *series ii*, 1880–*date*, *Rome*, 1872, *&c.*)

WILD, H. Repertorium fur Meteorologie. (*Red. von H. Wild*, *Vol. VIII*, 4to., *St. Petersburg*, 1883.)

WOLF, R. Schweizerische Meteorologische Beobachtungen. (I, 1863; *XXVI*, 1888, *&c.*)

WOEIKOFF, A. Die Klimate der Erde. (2 *Vols.*, 8vo, *Jena*, 1887.)

SECTION II.

METEOROLOGY AND CLIMATE OF SPECIAL GEOGRAPHICAL REGIONS.

ABERCROMBY, RALPH. Seas and Skies in many Latitudes. (8vo, *London*, 1888, 447 *pp.*)

BLANFORD, H. F. The Indian Meteorologist's Vade Mecum. (*Calcutta*, 1877.)

BLANFORD, H. F. A practical Guide to the Climates and Weather of India, Ceylon and Burmah and the Storms of Indian Seas. (*London*, 1889, 369 *pp.*)

BLODGETT, LORIN. Climatology of the United States. (*Philadelphia*, 1857.)

CHAMBERS, CHARLES. The Meteorology of the Bombay Presidency. (*London*, 1878.)

DALL, W. H. Meteorology of Alaska. Pacific Coast Pilot. (*Washington*, 1879.)

DAVIS, G. G. Ligeros Apunes sobre el Clima de la República Argentina. (*Buenos Aires*, 1889.)

DEUTSCHE SEEWARTE: Atlantischer Ocean. Ein Atlas von 36 Karten der physikalischen Verhaltnisse u. die Verkehrs-Strassen darstellend. (8vo, *pp.* 11, *ch.* 36, *Hamburg*, 1882.)

Findlay, A. G. A Text Book of Ocean Meteorology. Edited by W. R. Martin. (*London*, 1887.)
Greely, A. W. American Weather. (*New York*, 1888.)
Koeppen, Dr. W. u. Sprung, Dr. A. Die Regen-verhaltnisse des Atlantischen Oceans, nach den Beobachtungen deutscher Schiffe. (*Zeit. fur Met. XV, pp.* 475–479, *Wien*, 1880.)
Russell, A. North America, its Agriculture and Climate. (*8vo*, *Edinburgh*, 1857, *pp.* 1–304.)

SECTION III.

PERIODICALS.

(*a*) *Published by Individuals.*

Assmann, Dr. A. Das Wetter. Meteorologische Monatsschrift, herausgegeben von Dr. A. Assmann. (*Magdeburg*, *Vol. I*, 1884, *Berlin*, *Vol. VIII*, 1891.)
Deherain, M. P.-P. Anuales Agronomiques. (*Paris*, *I*, 1875, *XVII*, 1891.)
Gerland, Prof. Dr. G. Beiträge zum Geo-Physik. (*Stuttgart*, *Vol. I*, 1887, *Vol. IV*, 1891.
Hahn and Klein. Wochenschrift fur Astronomie, Meteorologie, u. Geographie. (*8vo*, *Koln*, 1884.)
Harrington, M. W. The American Meteorological Journal. (*Ann Arbor*, *Michigan*, *Vol. I*, 1884, *Vol. VII*, 1891, &c.)
Lancaster, Dr. A. Ciel et Terre. Revue populaire d'Astronomie, de Météorologie et du Physique du Globe. (Semi-monthly.) (*8vo*, *A. Lancaster redacteur*, *Brussels*, *I*, 1880, *XII*, 1892.)
Symons, G. J. Monthly Meteorological Magazine. (*12mo.*, *Vols. I–XXVI*, *London*, 1865 1891.)
Wollny, E. Forschungen im Gebiete der Agric-Physik. (*Heidelberg*, *Vol. I*, 1877, *Vol. XIV*, 1891.)

(*b*) *Published by Institutions.*

Berlin: Hydrographisches Amt. Annalen der Hydrographie u. maritimen-Meteorologie. (*8vo*, *Berlin*, *Vol. I*, 1868, *Vol. XX*, 1891.)
Edinburgh: Quarterly Jour. Royal Scottish Met. Society. (*Vols. I–IX*, *Edinburgh*, 1866–91.)
Hamburg: Meteorologische Zeitschrift. (*Hamburg*, *Vol. I*, 1884, *Vol. VIII*, 1891.)
London: Royal Meteorological Society. Quarterly Journal, n. s. (*8vo*, *London*, *Vol. I*, 1874, *Vol. XVII*, 1891.)
Paris: Annuaire de la Société Météorologique de France. (*Paris*, *Vol. I*, 1853, *Vol. XXXIX*, 1891.)
—— Revue Maritime et Coloniale. (*Vols. I*, 1849, *to CI*, 1889, *Paris*.)
Turin: Annuario Meteorologico Italiano. Organ of the Soc. Met. Ital. (*Turin*, *Vol. I*, 1885, *Turin*, *Vol. VI*, 1891.)
Vienna: Zeitschrift d. Oest. Gesell. fur Meteorologie; red. von Dr. J. Hann (monthly). *I*, 1866–*XX*, 1885. (*8vo*, *Wien*, 1866–1885.)
(*Merged into the Met. Zeit. of Hamburg.*)

PROCEEDINGS OF SOCIETIES.

Scientific Association.

March 16.—One hundred and fourth regular meeting. Dr. W. B. Clark in the chair.
Recent Work Concerning Immunity and the Cure of Infectious Diseases, by W. H. Welch.
Concerning Fertility of Soils, by Milton Whitney.
April 27.—Special Meeting.
Address by John Murray, LL. D., Ph. D., of Edinburgh (editor of the "Challenger" Reports), on Deep Sea Deposits.
May 18.—One hundred and fifth regular meeting. Dr. Morse in the chair.
A Captive Comet, by C. L. Poor.
The Tox-Albumins of Diphtheria, by Simon Flexner.
Drift with Oblong Projectiles, by G. O. Squier.

Philological Association.

March 18.—One hundred and seventeenth regular meeting. Professor Gildersleeve in the chair. Fifty-two members present.
Marie de France, by A. M. Elliott.
On the True Value of Statistical Methods in Syntactical Research, by B. L. Gildersleeve. (See p 102.)
April 29.—One hundred and eighteenth regular meeting. Professor Gildersleeve in the chair. Thirty-five members present.
Mene, Mene, Tekel, Upharsin, by J. D. Prince. (See p. 94 of *Circular* 98.)
On a proposed Vedic Concordance, a collection of Hymns and Sacrificial Formulas of the Literature of the Vedas, by M. Bloomfield. (See p. 99.)
Note on Psalm CX, v. 3, by P. Haupt.
May 20.—One hundred and nineteenth regular meeting. Professor Gildersleeve in the chair. Forty-five members present.
The Were-Wolf in Latin Literature, by K. W. Smith.
On O. Keller's Lateinische Volksetymologie und Verwandtes, by W. M. Arnolt.

Historical and Political Science Association.

Meetings from January 15 *to May* 21.—Professor Adams in the chair.
Constitutional and Legal Aspects of Repudiation, by W. A. Scott.
The Andover House in Boston, by D. Kinley.
Editorial Duty, by H. B. Adams.
The Laboulaye Manuscripts, by D. C. Gilman and E. R. L. Gould.
The Life of Laboulaye, by J. H. Hollander.
The Direction and Progress of Social Reform, by D. Kinley.
Some Characteristics of the Middle Ages, by P. M. Magnussen.
A Munich Thesis, by W. W. Whitelock.
The Population of the United States in 1870, by F. C. Waite.
The Pulpit and Social Problems, by F. I. Herriott.
The Pulpit as a Factor in Social Reform, by J. F. Heisse.
Freeman as a University Man, by H. B. Adams.
University Extension as a Career for University Men, by E. T. Devine.

Baltimore Naturalists' Field Club.

March 9.
Early Blossoming of Plants, by G. L. Smith.
Animal Tracks in Snow, by B. W. Barton.
Observations on Phalangidae, by E. A. Andrews.

Mathematical Seminary.

March 9.
Non-Hamiltonian time, by F. F. Almy.
A History of the Theory of Functions, by A. Cohen.
March 16.
The Action of Jupiter on Comet D, 1889, by C. L. Poor.
March 23.
The Attraction and Figure of the Earth, by J. M. Willard.
March 30.
A History of the Theta Functions, by E. P. Manning.
May 4.
A History of Infinite Series, by A. Cohen.
A History of Dirichlet, by N. A. Pattillo.

Physical Seminary.

The following papers have been read at recent meetings of the Physical Seminary:
Historical Sketch of Thermodynamics, by J. S. Ames.
On the Critical State of Gases, by P. H. Friese.
Properties of Gases at Low Temperatures, by F. A. Wolff.
The Modern Theory of Solutions, by H. C. Richards.
On Osmatic Pressure, by E. P. Lewis.
The Theories of Raoult's Experiments, by H. A. Bumstead.
On Capillary Phenomena, by A. B. Porter.
The Kinetic Theory of Gases and the Recent Modifications of Van der Waals' Equation, by J. S Ames.
On Water Waves, by F. F. Almy.
Langley's Bolometric Investigations, by C. A. Saunders.
Modern Electrical Theories, by J. S. Ames.
J. J. Thomson's Theory of the Electric Field, by G. O. Squier.
Poynting's Theory of the Electro-magnetic Field, by H. A. Bumstead.
On Magnetization of Iron, by A. B. Porter.
On Measurements of Specific Inductive Capacity, by R. R. Tatnall.
Modern Theory of Electrolysis, by E. P. Lewis.
Electro-chemical Theories, by F. A. Wolff.
Electric Discharge through Gases, by H. C. Richards.
On Hertz's Investigations, by P. H. Field.
Rotating Field Motors, by E. R. Carichoff.
Molecular Changes in Iron and Nickel, by F. F. Almy.

Young Men's Christian Association.

March 22.—Thirty-three persons were elected members, making the total number, including sustaining members, two hundred and forty.

May 3.—Mr. J. M. Willard, delegate to the Intercollegiate Deputation Conference, at Hanover, N. H., made a report, dwelling particularly upon the need of more systematic work among the students in our large cities.

May 10.—Committees were appointed for work among new students next autumn. The advisability of securing a permanent Secretary for the Association was discussed.

JOURNALS, ETC., ISSUED BY THE JOHNS HOPKINS PRESS, OF BALTIMORE.

I. American Journal of Mathematics.
S. Newcomb, Editor, and T. Craig, Associate Editor. Quarterly. 4to. Volume XIV in progress. $5 per volume.

II. American Chemical Journal.
I. Remsen, Editor. 8 Nos. yearly. 8vo. Volume XIV in progress. $4 per volume.

III. American Journal of Philology.
B. L. Gildersleeve, Editor. Quarterly. 8vo. Volume XIII in progress. $3 per volume.

IV. Studies from the Biological Laboratory.
H. N. Martin, Editor, and W. K. Brooks, Associate Editor. 8vo. Volume V in progress. $5 per volume.

V. Studies in History and Politics.
H. B. Adams, Editor. Monthly. 8vo. Volume X in progress. $3 per volume. Eleven "extra volumes" of this series have also appeared.

VI. Johns Hopkins University Circulars.
4to. Monthly. Volume XI in progress. $1 per year.

VII. Johns Hopkins Hospital Bulletin.
4to. Monthly. Volume III in progress. $1 per year.

VIII. Johns Hopkins Hospital Reports.
4to. Volume III in progress. $5 per volume.

IX. Contributions to Assyriology, etc.
Volume I. $8. Volume II in progress.

X. Annual Report of the Johns Hopkins University.
Presented by the President to the Board of Trustees.

XI. Annual Register of the Johns Hopkins University.
Giving the list of officers and students, and stating the regulations, etc.

The Register for 1891–92 *is now ready and will be sent on application.*

RECENT PUBLICATIONS.

The following list enumerates recent publications by those who have been or are now members of this University. It is printed for the information of their colleagues and friends, and is not supposed to be complete. The last previous list is given in *University Circulars, No.* 95. Papers in the *University Circulars* and *Hospital Bulletins* are not here noted.

Adams, H. B. Practical Philanthropy, as illustrated by the Life of Charles Loring Brace. (*The Charities Review, N. Y., April,* 1892.)

Adams, H. C. The Slaughter of Railway Employees. (*The Forum, N. Y., June,* 1892.)

—— and Vincent, J. M. Nordamerika seit 1762. (*Sonderabdruck aus den "Jahresberichten der Geschichtswissenschaft," Berlin,* 1892.)

Aldrich, W. S. Notes on Electro-Magnetic Machinery. (*Journal of the Franklin Institute, February,* 1892.)

Andrews, E. A. Experimental Embryology. (*The American Naturalist, May,* 1892.)

Arnolt, W. M. Review of Kluge's Etymologisches Wörterbuch der deutschen Sprache. (*American Journal of Philology, Vol. XII, No.* 4.)

—— Kirjath-sepher; Kirjath-sannah; Debir. (*The Christian Intelligencer, New York, February* 17, 1892.)

—— Paul de Lagarde. (*Ib., March* 2, 1892.)

—— The Assyro-Babylonian Months and their Regents. (*Ib., April* 20 *and* 27; *May* 4, 11, 18 *and* 25; *and June* 2, 1892.)

Bayley, W. S. Fulgurite from Waterville, Me. (*American Journal of Science, April,* 1892.)

Blackmar, F. W. Indian Education. (*Annals of the American Academy of Political and Social Science, Vol. II, No.* 6.)

Bloomfield, M. Contributions to the Interpretation of the Veda. Third Series. (*Journal of the American Oriental Society, Vol. XV, pp.* 143–88.)

1. The story of Indra and Namuci. 2. The two dogs of Yama in a new rôle. 3. The marriage of Saraṇyū, Tvaṣṭar's daughter.

—— The Essentials of Buddhist Doctrine and Ethics. (*International Journal of Ethics, Vol. II, pp.* 313–26.)

—— Review of Karl Brugmann's Grundriss der vergleichenden Grammatik der indo-germanischen Sprachen. (*American Journal of Philology, Vol. XII, pp.* 362–70.)

—— Contributions to the Interpretation of the Veda. Fourth Series. (*Ib., pp.* 314–43.)

1. The meaning of the root *yup*. 2. On *jalāṣaḥ*, *jalāṣabheṣajaḥ*, *jalāṣam*, and *jālāṣam*. 3. On the thirteenth book of the Atharva-Veda.

—— The Negro Problem. (*The Christian Register, February,* 25, 1892.)

Bond, A. K. Infant Foods other than Breast Milk. (*Maryland Medical Journal, March* 12, 1892.)

Brandt, H. C. G. Review of Thomas's and of Hewett's Hermann und Dorothea. (*Modern Language Notes, March,* 1892.)

Brigham, C. P. On the Double Halides of Bismuth. (*American Chemical Journal, Vol. XIV, No.* 2.)

Browne, Wm. H. Notes on Morris and Skeat's Specimens of Early English. (*Modern Language Notes, May,* 1892.)

Burnham, W. H. Illusions of Memory. (*Scribner's Magazine, February,* 1892.)

Burt, B. C. When should the Study of Philosophy begin? (*School and College, January,* 1892.)

—— Hegel's Theory of Right, Duties and Religion; translation with supplementary essay. (*Ann Arbor,* 1892.)

—— Cardinal Problems of Philosophy at the Present. (*Education, Boston, March,* 1892.)

—— Natural Science and the Philosophy of Nature. (*The Philosophical Review, May,* 1892.)

Cajori, F. The Study of Diophantine Analysis in the United States; Historical Note on the Differentiation of a Logarithm; A Mathematical Error in the Century Dictionary. (*Colorado College Studies,* 1891.)

—— Multiplication of Series. (*Bulletin of the New York Mathematical Society, Vol. I, No.* 8.)

Callaway, M. English in Our Preparatory Schools. (*Reprint from Proceedings of the Southern Educational Association for* 1891.)

Campbell, J. P. Biological Teaching in the Colleges of the United States. (*U. S. Bureau of Education, Circular of Information No.* 9, 1891.)

Canfield, W. B. Immunity and Protection from Disease. (*Transactions of the Medical and Chirurgical Faculty of Maryland, April,* 1891.)

Cary, A. Exploration on Grand River, Labrador. (*Bulletin of the American Geographical Society, Vol. XXIV, No.* 1, *March* 31, 1892.)

Cattell, J. McK. On Recent Literature on Association and Reaction. (*American Journal of Psychology, Vol. IV, No.* 3, *April,* 1892.)

Chapman, C. H. Weierstrass and Dedekind on General Complex Numbers. (*Bulletin of the New York Mathematical Society, Vol. I, No.* 7.)

—— An Elementary Course in Theory of Equations. (*Wiley & Sons, New York,* 1892.)

—— Application of Quaternions to Projective Geometry. (*American Journal of Mathematics, Vol. XIV, No.* 2.)

Clark, W. B. The Eocene of the United States. (*Government Printing Office, Washington,* 1891.)

Commons, J. R. A Popular Bibliography of Sociology. (*Literary Bulletin, Oberlin College, Vol. I, No.* 1, *January,* 1892.)

Conn, H. W. Bacteria in our Dairy Products. (*Popular Science Monthly, April,* 1892.)

—— Some Uses of Bacteria. (*Reprinted from Connecticut Agricultural Report,* 1892.)

Cook, A. S. Recent Opinion concerning the Riddles of the Exeter Book. (*Modern Language Notes, January,* 1892.)

—— New Texts of the Old English Lord's Prayer and Hymns. (*Ib.*)

—— A Literary Motive common to Old, Middle and Modern English. (*Ib., May,* 1892.)

Crew, H. On a New Method for obtaining a Constant Temperature. (*Philosophical Magazine, London, January,* 1892; *Haverford College Studies, No.* 11.)

—— On the Visible Spectrum of the New Star in Auriga. (*Astronomy and Astro-Physics, March,* 1892.)

Crutchfield, E. L. Case of Cerebral Hyperaemia terminating fatally. (*Maryland Medical Journal, January* 23, 1892.)

—— Some Favorite Prescriptions. (*Virginia Medical Monthly, Richmond, January,* 1892.)

Devries, W. L. Ethopoiia. A Rhetorical Study of the Types of Character in the Orations of Lysias.

Dissertation for the Degree of Doctor of Philosophy.

Dewey, D. R. The Nativity of New England. (*The Independent, N. Y., May* 19, 1892.)

Donaldson, H. H. The Size of several Cranial Nerves in Man as indicated by the Areas of their Cross-sections. (*The American Journal of Psychology, December,* 1891.)

—— Anatomical Observations on the Brain and several Sense-Organs of the blind deaf-mute, Laura Dewey Bridgman. (*Ib.*)

—— Reports on Recent Psychological Literature. (*Ib., Dec.,* 1891, *April,* 1892.)

Eichelberger, W. S. Orbit of Hyperion, 1892.

Dissertation for the Degree of Doctor of Philosophy.

Ely, R. T. The Proper Aims of Schools of Economics and Politics. (*The Independent, N. Y., May* 19, 1892.)

Finley, J. H. Trading Companies, II. (*The Chautauquan, February,* 1892.)

Fossum, A. Excavations in the Theatre of Eretria; The Stage-Building of the Theatre of Eretria. (*American Journal of Archæology, Vol. VII, No.* 3.)

Frothingham, A. L. Notes on Roman Artists of the Middle Ages, III; Two Tombs of the Popes at Viterbo by Vassallectus and Petrus Oderisi. (*American Journal of Archæology, March–June,* 1891.)

Garner, S. Review of Super's Readings from French History. (*Modern Language Notes, January,* 1892.)

Gildersleeve, B. L. The Creed of the Old South. (*The Atlantic Monthly, January,* 1892.)

Gilman, B. I. On Some Psychological Aspects of the Chinese Musical System (II). (*The Philosophical Review, March,* 1892.)

Gill, A. H. An Improved Pipette for Gas Absorptions. (*American Chemical Journal, Vol. XIV, No.* 3.)

Gilpin, J. E. Experiments with Mercurous Hypochlorsulphite. (*American Chemical Journal, Vol. XIV, No.* 2.)

Gudeman, A. A New Fragment of Cicero's *Hortensius* and Aristotle's *Protrepticus*. (*Transactions of the American Philological Association, Vol. XXII*, 1891.)

—— Critical Notes on the Dialogus of Tacitus, I, II. (*American Journal of Philology, Vol. XII, Nos.* 3–4.)

Hall, G. S. The Outlook in Higher Education. (*The Academy, January*, 1892.)

Hall, J. L. Beowulf. (*Heath & Co., Boston*, 1892.)

Halsted, G. B. Lobatschewsky—Geometrical Researches on the Theory of Parallels: Translation. (*Austin, Texas*, 1891.)

Hartwell, E. M. The Principal Types of Physical Training compared. (*Reprinted from the Boston Medical and Surgical Journal, December* 17 *and* 24, 1891.)

Haskins, C. H. More of McMaster's History. (*The Dial, May*, 1892.)

Haupt, P. Ueber die Ansiedlung der Russichen Juden im Euphrat und Tigris-Gebiete. (1892.)

Hempl, G. Initial *kn* in English. (*Modern Language Notes, March*, 1892.)

Hemmeter, J. C. On the Effects of Certain Drugs on the Velocity of the Blood Current; Acute Miliary Tuberculosis treated with Koch's Tuberculin. (*Transactions of the Medical and Chirurgical Faculty of Maryland, April*, 1891.)

Herty, C. H. On the Double Halides of Lead. (*American Chemical Journal, Vol. XIV, No.* 2.)

Hollander, J. H. Public Gas Works in the United States. (*The Independent, N. Y., January* 21, 1892.)

Huizinga, A. The Miracles of the Bible. (*Bibliotheca Sacra, January*, 1892.)

Hull, W. I. Maryland, Independence and the Confederation.
Dissertation for the Degree of Doctor of Philosophy.

Hume, J. G. The Value of a Study of Ethics. (*Toronto*, 1891.)

Hussey, G. B. Note on the Testimonia belonging to Plato's *Repub.* 398 A. (*Transactions of the American Philological Association, Vol. XXII*, 1891.)

Jastrow, J. Studies from the Laboratory of Experimental Psychology of the University of Wisconsin. (*The American Journal of Psychology, December*, 1891, *April*, 1892.)

—— Hypnotism and Suggestion. (*Ib.*)

—— Involuntary Movements. (*Popular Science Monthly, April*, 1892.)

Keeler, J. E. The Star Spectroscope of the Lick Observatory. (*Astronomy and Astro-Physics, February*, 1892.)

—— Elementary Principles governing the Efficiency of Spectroscopes for Astronomical Purposes. (*Reprint from Sidereal Messenger, No.* 99.)

Kelly, H. A. Methods of securing Asepsis in the Preparation of Instruments, Ligatures, &c. (*Wm. Wood & Co., New York*, 1892.)

Lanier, C. D. John McDonogh, Philanthropist. (*The Charities Review, May*, 1892.)

—— Walt Whitman. (*Chautauquan, June*, 1892.)

Lauer, P. E. Church and State in New England.
Dissertation for the Degree of Doctor of Philosophy.

Learned, M. D. Review of Paul's Grundriss der germanischen Philologie, and of Rentsch's Johann Elias Schlegel als Trauerspieldichter, etc. (*American Journal of Philology, Vol. XII, No.* 3.)

—— The Saga of Walther of Aquitaine. (*Modern Language Association, Baltimore*, 1892.)

Levermore, C. H. Methods and Results of Instruction in History. (*School and College, April*, 1892.)

Logie, T. Ninth Annual Convention of the Modern Language Association of America. (*Modern Language Notes, February*, 1892.)

—— The Subjunctive Mood in the Patois of Cachy (*Somme.*) (*Ib., May*, 1892.)

Lombard, W. P. Some of the Influences which affect the Power of Voluntary Muscular Contractions. (*The Journal of Physiology, Vol. XIII, Nos.* 1 *and* 2, *February*, 1892.)

Lord, J. Williams [and G. H. Rohe]. Practical Manual of Diseases of the Skin. (*Davis, Philadelphia*, 1892.)

Macmillan, C. Current Methods in Botanical Instruction. (*Education, Boston, April*, 1892.)

—— Suggestions on the Classification of the Metaphyta. (*The Botanical Gazette, April*, 1892.)

Mall, F. A Human Embryo twenty-six days old. (*Journal of Morphology, December*, 1891, *Vol. V, No.* 3.)

Magoun, H. W. Witchcraft among the Hindus; On Two Passages in the Crito; Note on the Hadley–Allen Grammar. (*Colorado College Studies*, 1891.)

Marquand, A. A Phœnician Bowl in the Metropolitan Museum, New York. (*American Journal of Archæology, March–June*, 1891.)

—— The History of Art as a University Study. (*University Magazine, May*, 1892.)

Martin, H. N. Recent Discoveries in the Physiology of Ganglion Cells. (*Transactions, Medical and Chirurgical Faculty of Maryland, April*, 1891.)

—— Vaso-Motor Nerves of the Heart. (*Ib.*)

Matzke, J. E. *i* in French *lieu*—Latin *locum*. (*Modern Language Notes, March*, 1891.)

—— Review of Rousselot's La Méthode graphique appliquée à la recherche des Transformations inconscientes du Langage, and of Koschwitz's La Phonétique expérimentale et la philologie Franco-Provençale. (*Modern Language Notes, May*, 1892.)

Mather, F. J., Jr. The Cynewulf Question from a Metrical Point of View. (*Modern Language Notes, April*, 1892.)

Meriwether, C. Charity in Japan. (*The Charities Review, May*, 1892.)

Morgan, T. H. The Growth and Metamorphosis of Tornaria. (*Journal of Morphology, December*, 1891, *Vol. V, No.* 3.)

Moore, J. L. Servius on the Tropes and Figures of Vergil, II. (*American Journal of Philology, Vol. XII, No.* 3.)

Mustard, W. P. The Etymologies in the Servian Commentary to Vergil.
Dissertation for the Degree of Doctor of Philosophy.

Nelson, J. Report on Oyster Culture. (*Annual Report of the New Jersey Agricultural Experiment Station*, 1891.)

Newcomb, S. Perturbations of the Four Inner Planets. (*Bulletin of the New York Mathematical Society, Vol. I, No.* 5, *February*, 1892.)

—— Results of the Observations of α Lyrae, made during the years 1862–67, with the Prime-Vertical Transit of the U. S. Naval Observatory. (*The Astronomical Journal, No.* 263, *April* 28, 1892.)

Nichols, E. L. On the Character of the Light emitted by Incandescent Zinc Oxide. (*Philosophical Magazine, London, January*, 1892.)

—— Note on the Selective Absorption of Light by Optical Glass and Calc-Spar. (*Ib., April*, 1892.)

Noyes, W. A. Di-Benzyl-carbinamine and its Conduct toward Nitrous Acid. (*American Chemical Journal, Vol. XIV, No.* 3.)

Noyes, W. On certain Peculiarities of the Knee-Jerk in Sleep in a Case of Terminal Dementia. (*American Journal of Psychology, Vol. IV, No.* 3, *April*, 1892.)

Orndorff, W. R. Decomposition with Alcohol of the Diazo Compounds obtained from some of the Nitro-naphthyl-amines. (*American Chemical Journal, Vol. XIV, No.* 1.)

—— Review of Tautomerism. (*Ib., No.* 3.)

Osborn, H. L. The Microscope and Biology. (*The Dial, May*, 1892.)

Osler, W. Principles and Practice of Medicine, designed for Practitioners and Students of Medicine. (*D. Appleton & Co., New York*, 1892.)

—— Remarks on Specialism—An Address. (*Boston Medical and Surgical Journal, May* 12, 1892.)

Petrie, C. L. Church and State in Early Maryland.
Dissertation for the Degree of Doctor of Philosophy.

Poor, C. L. The Action of Jupiter upon Comet V, 1889.
Dissertation for the Degree of Doctor of Philosophy.

Pratt, W. S. The Prayers of the Old Testament. (*Hartford Seminary Record, February*, 1892.)

Preston, E. D. Determinations of Gravity and of the Magnetic Elements in connection with the U. S. Expedition to the West Coast of Africa. (*Report of U. S. Coast and Geodetic Survey: Appendix* 12, 1890.)

Ramsay, F. P. New Names for the Forms of the Hebrew Finite Verb. (*Hebraica, Vol. VIII, Nos.* 1–2.)

Reese, C. L. Influence of Swamp Waters in the Formation of the Phosphate Nodules of South Carolina. (*American Journal of Science, May*, 1892.)

Reid, H. F. Studies of Muir Glacier, Alaska. (*National Geographic Magazine, Vol. IV, March* 21, 1892.)

Remsen, I. Researches on the Double Halides. (*American Chemical Journal, Vol. XIV, No.* 2.)

Richardson, G. M. On the Double Halides of Tin. (*American Chemical Journal, Vol. XIV, No.* 2.)

Rosewater, V. The Cost of Living. (*Charities Review, N. Y., April,* 1892.)

Roszel, B. M., and B. S. Annis. Solution of Struve's Equations for the Determination of the Aberration, taking into account the Possible Variability of the Latitude. (*The Astronomical Journal, No.* 266, *May* 24, 1892.)

Royce, J. The Spirit of Modern Philosophy. (*Houghton, Boston,* 1892.)

Sanford, E. C. A Laboratory Course in Physiological Psychology. (*American Journal of Psychology, December,* 1891.)

Saunders, C. E. On the Double Halides of Manganese; On the Double Halides of Antimony. (*American Chemical Journal, Vol. XIV, No.* 2.)

Schönfeld, H. Die Kirchliche Satire und Religiöse Weltanschauung in Brant's 'Narrenschiff' und Erasmus' 'Narrenlob,' resp. in den 'Colloquia,' I and II. (*Modern Language Notes, February and March,* 1892.)

Shaw, A. A Model Working Girls Club. (*Scribner's Magazine, February,* 1892.)

—— A Year of General Booth's Work. (*The Forum, February,* 1892.)

—— Conventions and Summer Gatherings of 1892. (*Review of Reviews, May,* 1892).

Sherwood, S. Syllabus of a Course of Twelve Lectures on the History and Theory of Money. (*University Extension Lectures, Phila., No.* 34.)

Sihler, E. G. Notes on the Roman Census in the Republican Era. (*Transactions of the American Philological Association,* 1891.)

Smyth, A. H. The Philadelphia Magazines and their Contributors, 1741–1850. (*Robert M. Lindsay, Philadelphia,* 1892.)

Smyth, H. W. Notes on Digamma. (*Transactions of the American Philological Association,* 1891.)

Stringham, I. A Classification of Logarithmic Systems. (*American Journal of Mathematics, Vol. XIV, No.* 2.)

Speirs, F. W. An Experiment in behalf of the Unemployed. (*The Charities Review, May,* 1892.)

Taber, H. On Certain Properties of Symmetric, Skew Symmetric, and Orthogonal Matrices. (*Proceedings of the London Mathematical Society, Vol. XXII, Nos.* 427, 428.)

—— On the Matrical Equation $\phi\Omega = \Omega\phi$. (*Proceedings of the American Academy of Arts and Sciences,* 1891.)

Todd, H. A. Review of Körting's Lateinisch-Romanisches Wörterbuch. (*Modern Language Notes, February,* 1892.)

Tolman, A. H. Studies in Macbeth. (*The Atlantic Monthly, February,* 1892.)

—— Shall and Will, and Should and Would. (*Modern Language Notes, April,* 1892.)

Tolman, W. H. University Extension at Brown University. (*University Magazine, February,* 1892.)

Trent, W. P. William Gilmore Simms. (*Houghton, Boston,* 1892.)

Vincent, J. M. Constitutional Reform in Belgium. (*The Nation, New York, March* 10, 1892.)

Warner, A. G. Report of the Superintendent of Charities for the District of Columbia, for the year ending June 30, 1891. (*Washington,* 1891.)

Warren, F. M. Review of Cloetta's Beiträge zur Litteraturgeschichte des Mittelalters und der Renaissance. (*Modern Language Notes, February,* 1892.)

Welch, W. H. The Causation of Diphtheria. (*Annual Address before the Medical and Chirurgical Faculty of Maryland, April,* 1891.)

Whitney, M. Soil Investigation. (*Baltimore,* 1892.)

Wilson. H. V. Notes on the Development of some Sponges. (*Journal of Morphology, December,* 1891. *Vol. V, No.* 3.)

Woodburn, J. A. States made from Territories, II. (*The Chautauquan, February,* 1892.)

Wood, H. Goethe's Elpenor. (*American Journal of Philology, Vol. XII, No.* 4.)

Woods, H. The Treatment of Trachoma (*Granular Lids*), with special reference to the method of "Expression," and to the use of Knapp's Roller Forceps. (*Maryland Medical Journal, March* 5, 1892.)

—— The Injurious Effects of Remedies in common use for Eye Diseases—Atropia, Yellow Oxide of Mercury, Nitrate of Silver; Blindness in the United States. (*Transactions of the Medical and Chirurgical Faculty of Maryland, April,* 1891.)

Wright, J. H. The Date of Cylon; A Study in Early Athenian History. (*Harvard Studies in Philology, Vol. III,* 1892.)

THE JOHNS HOPKINS PRESS.

The Old English Manor. By Charles M. Andrews, Ph. D. *Bryn Mawr College.* 303 pp., 8vo. Cloth. Price, $1.50. Ready June 8.

This work is an attempt to reconstruct the village and manorial organization and life in England at the beginning of the eleventh century. The study is based largely on the well known documents *Rectitudines Singularum Personarum* and *Gerefa*, the latter of which has never before been used for historical purposes. In addition, all Anglo-Saxon literature has been put under contribution, that the study might be as complete as possible. Such reconstruction has more than a merely antiquarian interest, for it relates to an important period of English economic history. It shows the complete isolation of local life, the preëminence of agriculture, and the secondary importance of craft and artisan work. It brings Anglo-Saxon farming methods into line with post-Norman and shows the tenacity of the old life and custom, crude and uneconomical as it was, uninfluenced to any great extent by the Norman Conquest. In the introduction the writer discusses the origin of the manor, suggesting points of view somewhat different from those ordinarily received by the Germanic school, but supporting, in opposition to Mr. Seebohm, the freedom of the village community.

An Introduction to the Study of the Constitution. A Study showing the play of Physical and Social Factors in the Creation of Institutional Law. By Morris M. Cohn, *Attorney-at-Law.* 240 pp., 8vo. Cloth. Price, $1.50. Ready June 8.

The theory underlying this work is that Constitutions, whether written or unwritten, represent the institutional growth of social communities; especially that institutional growth which is revealed in the governmental structure and maxims, and the jurisprudence, of the given community. The aim of the author has been to show with somewhat less detail than has been adopted in more voluminous productions, yet with sufficient breadth of outline, the general prevalence of constitutional institutions among peoples who have made any advance at all in political organization.

The illustrations of the subject have been taken principally from the fields of politics and jurisprudence, though when required, or when it seemed to the author appropriate, other sources were utilized.

America: Its Geographical History from the year 1492 to the present time. By Dr. Walter B. Scaife. (In Press.)

Starting with the discovery of Guanahani in 1492, the work shows, by reference to maps and writings of the sixteenth century, the evolution of the Atlantic and Pacific coast-lines in the consciousness of Europe. The third chapter sketches the slow growth of knowledge in Europe regarding the vast interior of the American continents and of the polar regions. There is a full discussion of the historical uses and the theories as to the origin of the names America, Canada, and Brazil. The history of our border lines, national and state, then engages the writer's attention; who passes from that subject to the geographical work of the national government, in treating which he has been aided by much information furnished direct from the offices of the Coast and Geological Surveys. In a supplement, Dr. Scaife undertakes to prove, contrary to the general opinion, that the Mississippi River is not always or even usually to be understood when the Spanish geographers mention the Rio del Espiritu Santo. The work will be illustrated by phototypes made from photographs of the famous Weimar and other maps, taken specially for the author. The volume will be sold for $1.50.

PRESENTATION OF THE LABOULAYE MANUSCRIPTS, MARCH 25, 1892.

Soon after the close of the academic session last summer, two volumes of manuscripts were sent to the University from Paris. They were the lecture notes of the late Professor Edouard Laboulaye upon the Constitution of the United States, and were presented by the sons of the deceased publicist, Messrs. Paul and René de Laboulaye. The meeting of the Historical Seminary, Friday, March 25, was the time chosen for the formal receipt and public exhibition of the manuscripts. The volumes had been presented through Dr. E. R. L. Gould, of the U. S. Department of Labor, and Mr. Theodore Stanton, of Paris. On the chosen date Dr. Gould had just completed a course of lectures at the University and was about to return to France.

Professor Herbert B. Adams, Director of the Seminary, opened the exercises by referring to the life-long friendship that had existed between Bluntschli, Lieber, and Laboulaye, who were contemporary professors of public law in Germany, the United States, and France. He said that soon after the reception of the Bluntschli library in Baltimore, the family of the Heidelberg professor had presented the University with his manuscript lectures; that somewhat later Mrs. Lieber had made the department the repository of the annotated copies of her husband's works. The present gift now completed the representation of the "international clover leaf."

President Gilman then read the letter of Mr. Paul de Laboulaye, French Ambassador at St. Petersburg, which accompanied the gift.

Paris, 4 *Juillet*, 1891.

Monsieur le Président,

M. Theodore Stanton, et plus tard M. E. R. L. Gould, se sont adressés à moi de votre part pour obtenir un écrit autographe de mon père destiné à la bibliothèque de la Johns Hopkins University à Baltimore. Mon absence de Paris m'a seule empéché de répondre plus tôt au vœu qui m'était exprimé d'une manière si honorable pour la mémoire de mon père. Dès que j'ai pu mettre un peu d'ordre dans les papiers laissés par lui, je me suis empressé de chercher ce que pouvait le mieux répondre au désir que je souhaite satisfaire. Je crois avoir eu la main heureuse en faisant choix du Cours sur l'histoire des États Unis.

C'est avec un réel plaisir, Monsieur le Président, que mon frère et moi nous remettons ce précieux dépôt entre vos mains pour qu'il reste à l'Université dont vous êtes le Président, comme le témoignage de l'estime que mon père avait pour les institutions américaines et qu'il nous a léguée. Nous sommes heureux à la pensée, que les nouvelles générations de votre pays pourront lire dans leur texte original les leçons d'un Professeur au Collège de France de qui on a dit qu'il était le plus américain de tous les Français, et le plus français de tous les Américains.

Veuillez agréer, Monsieur le Président, l'assurance de la considération particulière avec laquelle je me dis

Votre dévoué

Paul de Laboulaye,
Ambassadeur de France en Russie.

A sketch of the life of Professor Laboulaye, based upon Mr. John Bigelow's Recollections of Laboulaye, was read by Mr. J. H. Hollander.

Edouard Laboulaye was born in Paris in January, 1811. He was admitted to the bar in 1842. Six years later, during the Revolution of 1848, he was elected to a lectureship on the History of Comparative Legislation in the *Collège de France*, which continued the scene of his academic activity throughout the remainder of his life. Laboulaye early learned to know and admire American political institutions. He opened his lecture course in 1848 with an outline of the general principles of historical jurisprudence and proceeded, the following winter, to apply these principles to an analysis of the history and constitution of the United States. This was the first careful study of the American constitutional system that had yet been made in France. The lecture notes upon which the study was based, with certain modifications when the course was repeated in 1862 and 1863, constitute the manuscript volumes now in Baltimore. Laboulaye was a friend of the Union and rendered distinguished services to the United States in correcting and enlightening popular sentiment throughout Europe as to the real nature of the causes and issues of the Civil War. In 1871 he was elected deputy for Paris to the National Assembly and continued active in politics until his death on the 25th of May, 1883.

Dr. Gould made the following remarks:

"Laboulaye's life may be divided into three periods. As a young savant he was interested chiefly in historical jurisprudence. The titles of his earlier works generally indicate researches in this direction. The second phase of his career is practically contemporary with the second empire, and covers the period of his greatest usefulness as professor, author, and publicist. The third marks his entry into public life, as deputy and senator.

"In 1849 France was in a political turmoil. Democracy, triumphant in the Revolution of 1848, was master of the situation. Monarchy and privileges were now abolished and the ground was clear for a new political superstructure. Laboulaye was one of the most active of those who determined to build the republic anew from the corner-stone of self government.

"On December 4, 1849, he began a course of forty-eight lectures in the *Collège de France*, where he was Professor of Comparative Legislation. His theme was the Constitution of the United States. His intelligent purpose was to inform his countrymen concerning the nature of free institutions, and to influence them to regard the American system as a model of self government. His opening discourse was on the utility of a French study of the American Constitution. The remaining lectures were delivered on successive Tuesdays and Fridays during the academic year and dealt with the progress of those political ideas which germinated in our American colonial life, blossomed in the Declaration of Independence, and finally ripened in our present Constitution. In scientific grasp as well as in practical import these lectures are among the most remarkable of the many works of the great scholar and publicist. Beacons of patriotism no less than monuments of erudition they disclose a genuine ardor for freedom which finds fullest expression in these noble words: 'Liberty in France! 'tis the dream of fools, so critics say. Of the follies of love the young may be cured, but the old will die. The foibles of ambition are superseded by those of age or caprice. But of the love of *liberty* one can never be cured.'

"These lectures mark also the beginning of a polemic which Laboulaye never ceased to wage from his academic chair, from political platforms, and in his editorial columns against imperialistic policy and ideas. Laboulaye, like others of the greatest public men in France during the past half century, was a journalist and wielded his pen powerfully to advance the democratic cause.

"The manuscripts which the two distinguished sons of this famous man have presented to our Johns Hopkins University are those of this very course of lectures on the Constitution of the United States. Some of them remain as originally written, and some are evidently revised for later delivery in 1862-63. They are contained in two large octavo volumes and are, of all of his literary relics, the most appropriate for us Americans. The generous donors may rest assured that here these precious manuscripts will be carefully preserved and will receive lasting reverence as the production of French genius. They will furnish fresh inspiration to the American scholar and will be enshrined in that sacred cabinet which already contains literary souvenirs of two members of that illustrious triumvirate of publicists, Bluntschli, Lieber and Laboulaye." [*]

After briefly narrating the part taken by Mr. Theodore Stanton and himself in securing this valuable and historic gift, Dr. Gould then formally presented the manuscripts to the University on behalf of Messrs. Paul and René de Laboulaye.

At the conclusion of these addresses the Seminary resolved to present, through Dr. Gould, to Messrs. Paul and René de Laboulaye, of Paris, a message of grateful acknowledgements, and voted to adopt, as their own, the words of one of the speakers, and to assure the donors that these manuscript lectures of Professor Edouard de Laboulaye, on the Constitution of the United States, will be revered as the memorial of an illustrious statesman, who will ever be honored in this University for his own great merits and for his relations to Bluntschli and Lieber.

J. H. Hollander,
Secretary, Historical Seminary.

---

[*] Among the Bluntschli papers are the manuscript notes of lectures given during his professorial career at Zürich, Munich, and Heidelberg, and his note-books written when he was a student of Niebuhr at Bonn, and of Savigny at Berlin. Among the souvenirs of Lieber are his manuscript decisions as umpire on the Mexican Claims Commission of 1868, and his richly annotated copies of "Political Ethics" and 'Civil Liberty," containing materials for new editions.—H. B. A.

THE JOHNS HOPKINS ATHLETIC ASSOCIATION. CONSTITUTION AND BY-LAWS.

Constitution.

Article I. Name.

This association shall be known as The Johns Hopkins Athletic Association.

Article II. Membership.

Sec. 1. *Classes of Membership.* The association shall consist of active, associate, and honorary members.

Sec. 2. *Active.* The active roll shall consist of all members of the University who have paid their annual dues, and who shall comply with the constitution and by-laws.

Sec. 3. *Associate.* The associate roll shall consist of such former members of the University as shall continue to pay the annual dues of active members.

Sec. 4. *Honorary.* The honorary roll shall consist of those persons eligible for active membership whom the board of directors may elect honorary members, with exemption from payment of dues.

Sec. 5. *Privileges.* The property of the association shall be vested in its active members, who alone shall vote and hold office.

Sec. 6. *Membership of Teams.* Only members of this association shall be allowed to serve on its various teams.

Article III. Government.

Sec. 1. *Board of Directors.* The government of this association shall be vested in a board of directors, to be constituted as follows:

(1). Of one member of the Academic Staff, and of two graduate students, to be elected by ballot at the annual meeting of the association.

(2). Of three seniors, to be elected by the seniors in class meeting assembled.

(3). Of two juniors, to be elected by the juniors in class meeting assembled.

(4). Of one freshman, to be elected by the freshmen in class meeting assembled.

(5). Of the treasurer of the association. Any active member of the association shall be eligible for this office, which shall be filled by election by the board of directors.

Sec. 2. *Officers.* The president, vice-president, and secretary of the association shall be elected by the board of directors from its own membership. These officers and the treasurer shall be elected at a meeting of the board held as soon as possible after the annual meeting.

Sec. 3. *Term of Office.* The directors and other officers shall serve for one year, or until their successors are elected.

Sec. 4. *Failure to Elect.* In case any class fails to elect its representative directors, the board of directors may, after due warning, fill the vacant places by election from that class.

Sec. 5. *Absences.* In case any director is absent from three consecutive meetings without adequate excuse, the board may declare the place vacant.

Sec. 6. *Vacancies.* In case of vacancies arising from any cause, the board of directors shall have power to fill the vacancy, provided the proportionate representation of Section 1 is preserved.

Article IV. Alumni Committee.

Sec. 1. *Membership.* An advisory committee of three alumni not enrolled as members of the University shall be constituted as follows:

(1). Of two to be selected by the Alumni Association.

(2). Of one to be elected by ballot by the Athletic Association at its annual meeting.

Sec. 2. *Powers.* This committee shall supervise the welfare of athletics in this University, and shall exercise such powers as the board of directors or the association may confer upon it from time to time by special vote.

By-Laws.

Article I. Duties of Officers.

Sec. 1. *President.* The president shall preside at all meetings of the association and board of directors. In his absence his duties shall be performed by the vice-president. If both are absent a chairman *pro tempore* shall be elected.

Sec. 2. *Secretary.* The secretary shall conduct the official correspondence, have charge of the records, issue notices, and keep full minutes of the proceedings at meetings of the association and board of directors.

Sec. 3. *Treasurer.* The treasurer shall have charge of all the funds belonging to the association, shall collect all dues, shall make all necessary disbursements upon approval of the board of directors, and shall report to the board, whenever required, the state of the treasury of the association, its receipts and disbursements, and shall make an annual report to the association.

Sec. 4. *Directors.* The board of directors shall have the full management and control of all property, effects and assets of the association, with power to sell and dispose of the same, or any part thereof.

They shall enforce the preservation of order and obedience to the constitution and by-laws. They shall have power to suspend by a two-thirds ($\frac{2}{3}$) vote, by ballot, for any period, from any or all privileges of membership, any person refusing to serve on any team at any time, or failing to comply with the provisions of the constitution and by-laws.

The board shall vote on all candidates for honorary membership who shall have been proposed at a previous meeting of the board. The election so held shall be secret and by ballot. Two negative votes shall be sufficient to reject the candidate.

Article II. Dues.

The dues shall be two dollars ($2.00) payable annually at the beginning of the academic year.

Article III. Committees.

Sec. 1. *General Committees.* The president shall appoint committees, of as many members as he may see fit, to take charge of and control the various games, sports, and exercises of the association.

Sec. 2. *Nominating Committee.* At least twenty-four hours before the annual meeting the presiding officer of the association shall appoint a nominating committee. This committee shall present at the annual meeting:

(1). The names of five graduates and of one member of the faculty, from whom to elect the directors provided for in Art. III. Sec. 1, paragraph (1), of the constitution.

(2). The names of three alumni from whom to elect the alumnus to represent the association on the advisory committee.

The nominations may be amended or added to by vote at the meeting.

Article IV. Meetings.

Sec. 1. *General Meetings.* The annual meeting of the association shall be held about the fifth (5th) of October. Special meetings may be called at any time by the presiding officer. A quorum shall consist of one-fourth ($\frac{1}{4}$) of the active members of the association.

Sec. 2. *Meetings of Directors.* The board of directors shall hold such meetings as they may decide upon. Special meetings may be called at any time by the presiding officer. Five (5) members shall constitute a quorum.

Sec. 3. *Order of Business.* The order of business of the meetings of the association and of the board of directors shall be as follows:

1. Reading of minutes of previous meeting.
2. Reports of officers and committees.
3. Nominations and elections.
4. Deferred business.
5. New business.
6. General business.

Sec. 4. *Rules of Order.* The proceedings of this association shall follow Roberts' Rules of Order in so far as they are not inconsistent with the constitution and by-laws.

Article V. Amendments.

Amendments to the constitution and by-laws shall be proposed at a general meeting of the association, and shall stand if unanimously approved; otherwise they shall lie over until a second meeting, when a two-thirds ($\frac{2}{3}$) vote shall be necessary for their adoption.

The foregoing is a true copy of the constitution and by-laws of the Athletic Association, as adopted at the January, 1892, Meeting, to take effect October 1, 1892.

William Levering Devries,
Chairman of the Committee of Revision.

Attest:
Edward Renouf,
President of the Association.

The Modern Language Association of America: Eighth Annual Meeting.

An abstract of the papers read at the meeting and printed in the publications of the Association (1891). By Professor J. R. Wightman, of Iowa College.

The Eighth Annual Convention of the Association was held in Nashville, Tenn., on December 29, 1890, and following days. The meeting was opened with an address of welcome by Chancellor Garland, of Vanderbilt University.

The first paper read was by Professor Albert S. Cook, of Yale University, on, "The Name Cædmon."

Two derivations have been suggested for this word, viz., "b Cadmin," or "Cadmon,"—both Hebrew for "beginning"—and the British "Catumanus." Prof. Cook prefers the former. He says that it agrees better with phonetic laws, and he adduces facts to show that there was enough Oriental learning at Whitby in Cædmon's day to account for his having a Hebrew name. He suggests a possible connection between Cædmon and the Phœnician Cadmus.

Prof. John P. Fruit, of Bethel College, followed with a paper on "A Plea for the Study of Literature from the Æsthetic Standpoint."

To show that excellency of workmanship is found in the highest art, the writer examined Tennyson's poem of "The Miller's daughter," which, he said, gives us a picture perfect and complete in all its parts. The artist's material, though spiritual, must have a physical basis, and this, in literature, is none other than language. And as language is superior to other mediums for expressing thought, so does literature contain the highest art. Because of the cheapness of books, moreover, this highest art is now accessible to all. If teachers would but teach the masters in literature, and that from the æsthetic standpoint, there would be fewer poor writers, and "trashy" novels and newspapers would be less read.

President Shepherd, of the College of Charleston, then read a paper on some phases of Tennyson's "In Memoriam."

After putting forward a plea for the study of the literary side of language, the writer compared the two great English elegiac poems, "Lycidas" and "In Memoriam." Both show broadness of scope and intensity of sincerity, but Tennyson's attachment to Hallam seems to have been much stronger than that of Milton to King. The conditions attending the composition of the two poems were very similar. In "In Memoriam" the doctrine of a personal immortality, as opposed to Pantheism, was strongly taught, and that with much artistic grace, as *e. g.*, in division 46 of the poem. The rime used was not original with Tennyson. A love of allegory was conspicuous, perhaps the effect of Newman and the Oxford school. The proper ending of the poem was at stanza cxxx, and the likeness of this to the first stanza shows the artistic unity of the whole.

The next paper was by Prof. E. H. Babbitt, on, "How to Use Modern Languages as a Means of Mental Discipline."

Language study, as teaching the clear and forcible expression of thought, is the best means of developing judgment, or the reasoning faculty. The writer asks, what the ordinary student obtains from his study of the classics; and replies, 1. He has strengthened his memory for facts. 2. By classifying facts, he has learned to remember things by their relations. 3. He has strengthened his judgment. 4. He has gained in knowledge of his own language. 5. His knowledge of the classics is perhaps sufficient to use them as tools. What advantages can the Modern Languages present to offset these? The memory has perhaps equal exercise in each group of studies. Under the second head the classics would seem to excel, and perhaps also under the third. The fourth benefit arises from translation. Except in the nursery, the true home of the "natural method," translation should be the central point of language instruction. Here the modern languages are superior to the ancient, because the pupil, knowing better the things of which he is reading, can be held to a stricter translation. The modern languages, moreover, are better suited for sight-reading, a most useful exercise. Translation should be clear and idiomatic, and while accurate, should be more rapid than is common in colleges.

The subject next treated of was, "The Acadians of Louisiana, and their Dialect," by Prof. Alcée Fortier, of Tulane University.

The writer first speaks of Acadia, and of the landing about the year 1763, of the Acadians at and above New Orleans. Now they are found all over Lower Louisiana. They speak French, which, among the lower classes, is Acadian French mixed with Creole patois. In some parishes, English is scarcely spoken, and French, in addition to English, is taught in the public schools. An interesting visit, which Prof. Fortier made to the town of Martinsville, is then described. In treating of the language, he says that the patois of different localities now show great differences, mainly due, he thinks, to local causes and to the influence of the English. Many picturesque expressions and some quaint nautical terms were cited. The paper then went on to give a general indication of the Acadian pronunciation of the various letters, with some points in morphology and syntax, and closed with the production of two passages written in the dialect.

"The Translation of Anglo-Saxon Poetry," was the title of the next paper, by Prof. James M. Garnett, of the University of Virginia.

The writer declares himself in favor of the *Zweihebung theorie* as to the structure of Anglo-Saxon poetry, and thinks that the best modern English representative of such a measure will have two half-verses, each with two accents, and separated by a well marked cæsura. Alliteration should be used, if compatible with accuracy. Line for line translation is preferable, and inversion is permitted, as also the occasional placing in accented places of words usually unaccented. As to vocabulary, all words are permissible that are found in English poets dating from the Elizabethan period, as also archaic words revived by living poets. The paper closed with a citation from a recent translation of "The Dream of the Rood," which illustrated the use of the four accent verse, described above.

The next paper was one by Charles Davidson, of Belmont, Cal., on the "Phonology of the Stressed Vowels of Beowulf."

This was followed by one on the "Riming System of Alex. Pope," by Mrs. L. Mary McLean, of the University of California.

Of the rimes in Pope's works, 6847 are *Masc.*, and 115 *Fem.*; of the false rimes, almost all are rimes at least, to the eye. A list of rimes is given to show that Pope does not use great variety. Many of those that now seem false were probably true in the poet's time, as "beseig'd," and "oblig'd." A complete list of masculine, feminine, unclassified and false rimes ends the paper.

Prof. Sylvester Primer then read a paper, entitled "Dialect Studies in West Virginia." (A continuation of a former article on "The Pronunciation of Fredericksburg, Va.," *cf.* "Publications of Modern Lang. Assoc.," Vol. v, No. 2.)

After a few historical remarks the paper quotes words to show the pronunciation of the vowels. Among peculiarities noted were *mek* for *make*,—as in seventeenth century English, and the present pronunciation of some counties of England,—*led* for *lid*, *toitle* for *title*, and other similar ones. A number of curious and quaint expressions commonly heard in the district were quoted.

The last paper read was by Mr. Calvin S. Brown, Jr., of Vanderbilt University, on "Other Dialect Forms in Tennessee."

A more correct title for the paper, would be, as its author remarked, "Some language peculiarities in Tennessee." To these were added some examples of bad pronunciation, though it was not asserted with respect to either the latter or the former that they are peculiar to the region named.

THE JOHNS HOPKINS PRESS.

The Saga of Walther of Aquitaine. By M. D. Learned. 214 pages. 8o. *Now ready.*

A few copies are offered for sale at $1.50 in paper and $2.00 in cloth.

Bibliographia Hopkinsiensis: Part I, Philology. Edited by Professor Bloomfield. *Now ready.*

A list of important publications by members of the University, 1876–1891. 52 pp. 8o. Paper. 30 cents.

A Memoir on the Genus Salpa. By William K. Brooks, Ph. D. (*In Press.*)

This volume will contain about two hundred pages, quarto, with fifty colored plates. The Memoir is based for the most part on material collected by the United States Fish Commission.

Advance orders will now be received. The edition will be limited. The price is fixed at $5.00 net.

Orders should be addressed to The Johns Hopkins Press, Baltimore.

CURRENT INFORMATION.

The NORTHWESTERN ASSOCIATION OF JOHNS HOPKINS ALUMNI was formally organized at a meeting held in Madison, Wisconsin, on March 31, 1892. The members present were Messrs. Turner, Haskins, Loomis, Hillyer, Jastrow, Hobbs, and Parkinson, of the University of Wisconsin, and Professor Patrick, of Iowa State University.

Letters from a number of the alumni in the Northwest were read, approving the plan of organization.

A constitution was adopted, and officers were elected as follows:—

President—Professor C. H. HASKINS, of Madison.

Vice-President—Professor G. T. W. PATRICK, of Iowa City.

Secretary and Treasurer—Professor W. H. HOBBS, of Madison.

Professors H. F. NACHTRIEB, of the University of Minnesota, and J. T. HATFIELD, of Northwestern University, were named as additional members of the Executive Committee.

Mr. OLIVER ELTON (B. A., University of Oxford), Lecturer on English Literature in Owens College, gave three lectures, April 11, 12, 13. His subjects were Elizabethan Poetry, Christopher Marlowe, and George Chapman. He also gave a series of class lectures daily from April 20 to April 29.

The THREE HUNDREDTH ANNIVERSARY of the birthday of COMENIUS was celebrated on Friday, March 25. President GILMAN gave an address on the life of Comenius and his services to education.

WILLIAM F. WILLOUGHBY (A. B., 1888) has received the prize of $200 offered by the American Economic Association, for his essay on the "Housing of the Poor in American Cities."

Dr. M. D. LEARNED is to be Dean of the Schools and Director of the German Department of the Summer School at Mountain Lake Park, Md., during the coming summer. Dr. JAMES T. HATFIELD will have charge of the School of Latin and French; Mr. C. H. Ross, of the School of English; Dr. W. W. RANDALL, of the School of Chemistry and Physics.

Professor J. RENDEL HARRIS has been appointed by the regents of the Pitt Press of Cambridge University, England, to take charge of the work in connection with the forthcoming edition of the Septuagint.

At the recent MEDICAL SCHOOL COMMENCEMENTS the following graduates of the Johns Hopkins University received the degree of M. D.:

From the University of Maryland: DELANO AMES (A. B., 1891); B. B. LANIER (A. B., 1890); T. B. MARDEN (A. B., 1890); J. E. STOKES (A. B., 1890); J. H. WRIGHT (A. B., 1890).

From the College of Physicians and Surgeons: E. C. APPLEGARTH (A. B., 1887, Ph. D., 1890).

From the University of Pennsylvania: WALTON BOLGIANO (A. B., 1889); A. J. PATEK (A. B., 1889).

From the University of the City of New York: J. C. JOHNSTON (A. B., 1890).

At the recent Commencement of the LAW SCHOOL of the University of Maryland, the degree of LL. B. was conferred upon the following graduates and former students of the Johns Hopkins University:

Vernon Cook (A. B., 1890); Charles L. Fulton (A. B., 1889); E. Parkin Keech, Jr. (A. B., 1890); Sylvan H. Lauchheimer (A. B., 1890); William W. McCulloh (A. B., 1889); Isaac L. Straus (A. B., 1890); Walter C. Humphreys (Special Student, 1887–91).

Rev. W. R. HUNTINGTON, D. D., of New York, will deliver the Levering course of lectures in 1893. His subject will be the Four Monosyllables of Religion: 1. Light; 2. Life; 3. Law; 4. Love. The dates of the lectures will be Monday and Tuesday, January 30 and 31, and February 6 and 7.

The Board of Trustees having referred the matter of ACADEMIC DRESS to the Board of University Studies, the latter body has adopted the following resolutions:

Resolved, That every Doctor of Philosophy of the Johns Hopkins University shall be entitled to wear, on all fitting occasions, a gown of the prescribed shape, made of either black silk or black stuff, and a hood made of black silk, lined with scarlet silk and edged with gold.

Resolved, That every Bachelor of Arts of the Johns Hopkins University shall be entitled to wear, on all fitting occasions, a gown of the prescribed shape, made of black stuff, and a hood made of black stuff, lined with white silk and edged with dark blue.

Professor W. W. GOODWIN, of Harvard University, gave an informal talk on Sicily to members of the Greek Seminary in Levering Hall on April 7.

OBITUARY.

Mr. JAMES STARR TRUEMAN, Professor of Greek and Latin in Allegheny College, Pa., died at Thomasville, Ga., March 23, 1892, in his thirty-fourth year. Professor Trueman was a native of New Brunswick, Canada. He graduated at Dalhousie University in 1882, and in October, 1885, entered the Johns Hopkins University. He held a fellowship in Greek here during the year 1888–89, and in September, 1889, he was appointed to a Professorship in Allegheny College.

Dr. DAVID MEREDITH REESE, of Baltimore, died at Saranac Lake, N. Y., April 11, 1892, in his twenty-seventh year. Dr. Reese was a special student of Biology and Chemistry in the Johns Hopkins University from 1884 to 1886. He received the degree of M. D. from the University of Maryland in 1889, and held, successively, positions on the medical staffs of the University Hospital, Bay View Asylum, and the Johns Hopkins Hospital. In October, 1891, he was appointed Medical Assistant to the Superintendent of the Shepard Asylum.

Mr. JAMES McDONALD PATTERSON died at Pasadena, Cal., March 8, 1892. Mr. Patterson was born in New York in 1864, and, at an early age, removed with his family to Denver. From 1880 to 1885 he attended various schools in Germany and France. He was a special student of History in this University during the years 1885–1887. The year 1887–88 he spent in the Law School of the University of Virginia, and was admitted to the bar of Colorado in 1889, and has since practised law in Denver.

Mr. HAMILTON McFARLAND BROWN, of Baltimore, died in this city May 8, 1892, aged 24. He entered the Johns Hopkins University from Maupin's University School in October, 1885, and gained by competitive examination one of the Hopkins Scholarships awarded at entrance. In June, 1888, he received the degree of Bachelor of Arts. Since that time he has been engaged in mercantile pursuits in Baltimore.

Professor EDWARD PAYSON SMITH, of the Worcester Polytechnic Institute, who died in Worcester on May 2, was a student of this University, during the year 1887–88, in the department of History and Politics, holding the office of Fellow by Courtesy. Professor Smith was a graduate of Amherst College, and had been a teacher for twenty years in the Worcester Polytechnic Institute.

WILLIAM CONDEE BELL, of Due West, S. C., died in Baltimore May 28, 1892, aged 25. He graduated from Erskine College, S. C., in 1886, and pursued graduate courses in English and German in this University during the years 1889–90 and 1891–92.

CONTENTS.

PAGE.

NOTES OF RECENT PUBLICATIONS, INVESTIGATIONS, and STUDIES.
  A Vedic Concordance, by **Maurice Bloomfield**, - - - - 99
  Contributions to the Interpretation of the Veda, by **Maurice Bloomfield**, - - - - - - - - - - - - 101
  On εἰ with Future Indicative, or Statistics and Statistics, by **B. L. Gildersleeve**, - - - - - - - - - 102
  Notes on the Theory of the Transformer, by **H. A. Rowland**, 104
  Investigations on the Double Halides, - - - - - - 105
  The Saga of Walther of Aquitaine, by **M. D. Learned**, - 105
  Recent Contributions to Meteorology, by **Cleveland Abbe**, 106

PAGE.

Catalogue of Recent Meteorological Works, by **Cleveland Abbe**, - - - - - - - - - - - 108
Proceedings of Societies, - - - - - - - - - 109
Recent Publications, - - - - - - - - - - 110
Johns Hopkins Press: Announcements, - - - - 109, 112, 115
Presentation of the Laboulaye Manuscripts, - - - - - 113
Constitution of the Athletic Association, - - - - - 114
Modern Language Association: Eighth Annual Meeting, - - 115
Current Information, - - - - - - - - - - 116

The Johns Hopkins University Circulars are issued monthly. They are printed by Messrs. JOHN MURPHY & CO., No. 44 West Baltimore Street, Baltimore, from whom single copies may be obtained; they may also be procured from Messrs. CUSHING & CO., No. 34 West Baltimore Street, Baltimore. Subscriptions $1.00 a year, may be addressed to THE JOHNS HOPKINS PRESS, BALTIMORE; *single copies will be sent by mail for ten cents each.*